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Ontario Department of Education

MANUAL TRAINING

AND

HOUSEHOLD SCIENCE

IN THE

HIGH, CONTINUATION, PUBLIC, AND SEPARATE SCHOOLS

REGULATIONS

FOR

THE ESTABLISHMENT AND MAINTENANCE OF COURSES

AND

FOR TEACHERS' CERTIFICATES

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:

Printed and Published by A. T. WILGRESS, Printer to the King's Most Excellent Majesty

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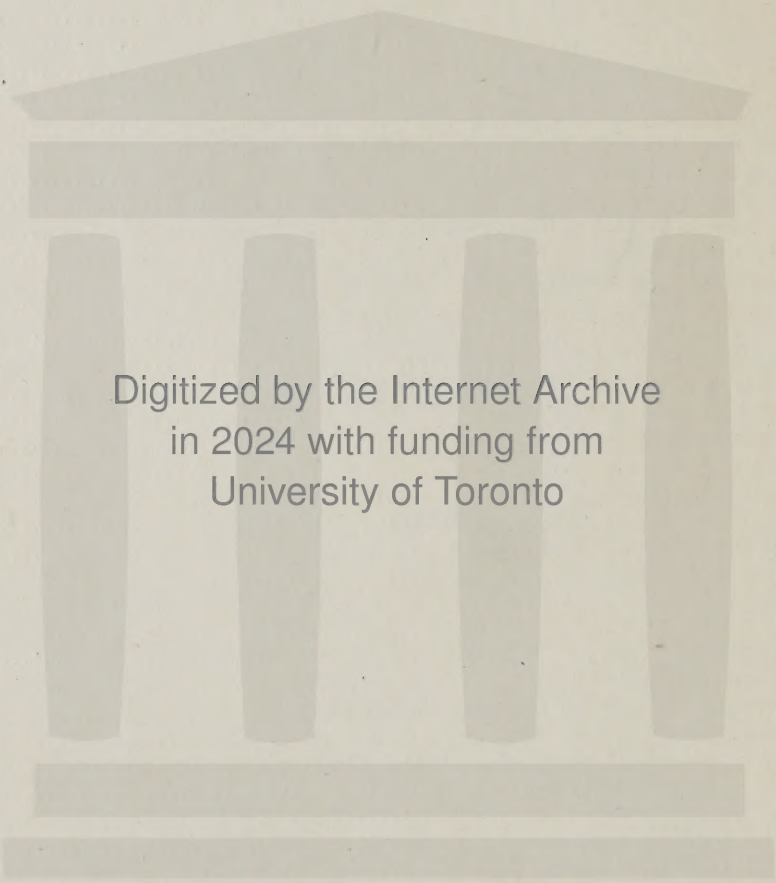
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Regulations for Manual Training and Household Science Courses

INTRODUCTORY

Vocational education includes all forms of education which fit for useful callings. Three forms are recognized in *The Industrial Education Act* and the Regulations: Industrial and Technical, including Art; Agricultural; and Commercial. In the Act and the Regulations the name "technical" is applied to schools and classes for the preparation of foremen and forewomen and the holders of minor directive positions in the trades and other industries; the name "industrial," to schools and classes which meet the needs of manual workers in the trades and other industries, including the occupations of girls and women. In the industrial and technical schools and classes, except where subjects like English literature, for example, are added for purely cultural purposes, all the subjects of the courses have an industrial aim. Manual Training and Household Science, on the other hand, are regular subjects of a modern elementary or secondary general course; they form a necessary part of the liberal education which every boy and girl should receive. Like the other subjects of such a course, they are cultural, but they are also especially practical. For each of them provision in school is usually not more than two hours or an hour and a half a week, whereas, in industrial and technical courses the workshop practice needs from three to five half days a week, according to the subject and the stage of the pupil's advancement. Moreover, while introductory to industrial and technical courses, Manual Training and Household Science are neither technical nor industrial themselves. And lastly, whereas the classes in Manual Training and Household Science are directly controlled by the School Boards, the industrial and technical schools and classes are managed by specially constituted Advisory Industrial Committees, subject in some of their duties to the approval of the Minister and the School Board. The foregoing distinctions are important and should be borne in mind.

The Manual Training and Household Science courses begin in the Kindergarten and are continued throughout all the forms of the Public and Separate Schools and the Lower Schools of the High and Continuation Schools, the courses in the Fifth Forms and the Lower Schools being organized in accordance with local conditions. After the introductory courses in the lower forms of the Public and Separate Schools, courses in wood-working and wood-turning and the associated drawing, and in hand and machine sewing, cookery, and sanitation and hygiene are sufficient for the purposes of a liberal education. The forging and the machine-shop practice, with their associated drawing, properly form part of technical and industrial courses; but, except where comprehensive industrial or technical courses have been established, these subjects are for the present permitted by the Department of Education as extensions of the Manual Training course for the High and Continuation Schools, and are included therein for the purpose of distributing the Legislative Grant.

GENERAL REGULATIONS

The following regulations apply specially to city and town schools. On pp. 41-52 are regulations which apply specially to rural and village schools.

ESTABLISHMENT

1.—(1) With the approval of the Minister, courses in Manual Training and Household Science, as prescribed in the syllabuses of the High, Continuation, Public, and Separate Schools, may be established and maintained under the regulations below by the boards of said schools, either separately or in co-operation, in the same or in different municipalities or high school districts.

NOTE.—Villages and towns of less than 5,000 population, which might find it too expensive to maintain independently Manual Training and Household Science Courses and which are within easy reach of one another, should form themselves into co-operative groups, each equipping one or more centres and employing a part time teacher in common.

(2) When the courses in Manual Training or Household Science are established or maintained in co-operation by different Boards, the provision for joint management and for financial support shall be such as may be mutually agreed upon by such Boards, with the approval of the Minister.

NOTE.—As Manual Training and Household Science are regular subjects of the school syllabuses, the cost of establishing and maintaining them shall be provided for in the same manner as are the other subjects, and, in apportioning the cost of the High School between the district and the county, the receipts and expenditure for Manual Training and Household Science shall, accordingly, be included in the Board's statement. (See High Schools Act, Sections 33 to 36.)

QUALIFICATIONS OF STAFFS

2.—(1) (*a*) The Elementary certificate in Manual Training granted under the present Regulations is valid in any Provincial school except a Collegiate Institute; the Elementary certificate in Household Science is valid in rural or village public or separate schools.

(*b*) The certificate in Elementary Industrial Arts granted before 1912, and the certificate in Elementary Manual Training granted before 1916 are valid in rural or village public or separate schools only.

(*c*) The Intermediate certificate in Manual Training granted in 1915 is valid for wood-work only, in any Provincial school except a Collegiate Institute.

(2) The Ordinary or the Specialist's certificate in Manual Training or Household Science is valid in any of the schools of the Provincial system; but Specialists shall have the preference in appointments to the staffs of the Collegiate Institutes, and, as soon as the supply is adequate, Specialists alone shall be qualified to hold positions in Collegiate Institutes.

(3) The foregoing Regulations in regard to certificates in Manual Training and Household Science shall not affect the status of any one who is qualified in 1912 as a teacher in either of these departments under the Regulations then in force.

NOTE.—The syllabuses of the various courses may be obtained as follows: From the Registrar of the University of Toronto, the syllabus of the courses for Specialists' certificates in Household Science; from the President of the Ontario Agricultural College, Guelph, the syllabuses of the courses for Ordinary and Specialists' certificates in Manual Training; and from the Dean of the Faculty of Education of Toronto University, the syllabuses of the courses for Ordinary certificates in Household Science and for Elementary certificates in Manual Training.

DAY CLASSES

Organization

3.—(1) Except in Forms I and II of the Public and Separate Schools, there shall be not more than twenty-four pupils under one teacher at one time in any of the classes.

(2) The time apportioned each class at each centre shall be not less than one and one-half hours a week taken at one time, except in the case of Forms I and II of the Public and Separate Schools, where it should not be less than three-quarters of an hour.

(3) The general organization shall be subject to the Minister's approval.

(4) (*a*) In a form approved by the Minister, there shall be kept a register showing the attendance and the work of each pupil, and a stock-book containing a list of the equipment and supplies used, with the cost of the same. The stock-book should be checked at least once each half-year, and should show all the additions and losses since last checking.

(*b*) The form of Manual Training Register in the illustration on pp. 8 and 9 is a very convenient one, as it shows on one opening the attendance and the work of each boy. The numbers on the left-hand page correspond to a numbered list of "models" or "projects" listed in the front of the register. When the project is completed its number is entered opposite the pupil's name under the date on which it was completed. The same form may also be used for the Household Science classes, the subject of the lesson being written under the date on which the lesson was given.

Accommodations

4.—(1) The plans of any building to be erected or of any rooms to be provided for Manual Training or Household Science shall be submitted to the Minister before construction is begun and shall be subject to his approval. Before a site for a new building is finally selected, the Minister's approval shall also be obtained.

(2) Below are detailed the requirements for the accommodations for Manual Training and Household Science classes. These shall be considered as divided into four grades according to their character and extent, and the report of the Inspector thereon shall be in accordance with this classification.

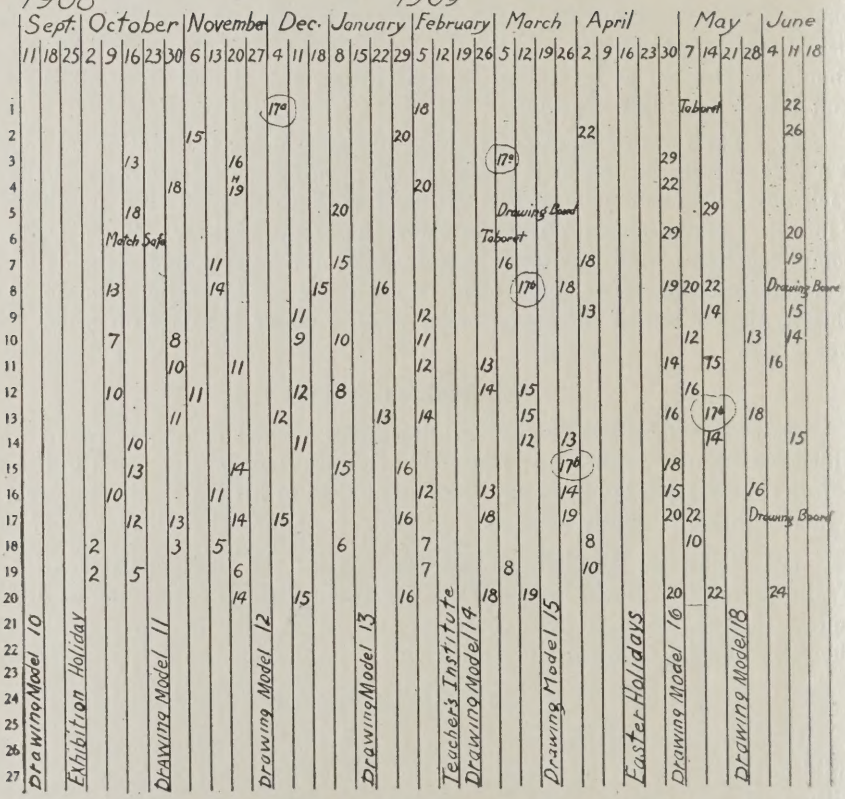
I. Manual Training

When accommodations have yet to be provided, Boards should erect a separate building adjacent to the school and communicating therewith, when practicable, with a covered corridor, and having accommodations as detailed below. When rooms in a building already erected are to be adapted, the conditions detailed below should be observed, as far as practicable. As a general prescription, it should be borne in mind that the workshops should be so situated as not to disturb the rest of the school.

Wood-working Shop.—A room 30 feet by 40 feet, situated above ground, will provide for all the requirements of wood-working and wood-turning. A basement room, unless specially erected for the purpose, is seldom satisfactory. For demonstration purposes, a portion of the shop should be set apart with two or three tiers of benches or chairs for the pupils, and with a blackboard, and a bench and set of

Centre FIRST AVE Time and day of Attendance

COMPLETED MODELS


1908
1909
Sept. October November Dec. January February March April May June
11 18 25 2 9 16 23 30 6 13 20 27 4 11 18 8 15 22 29 5 12 19 26 5 12 19 26 2 9 16 23 30 7 14 21 28 4 11 18
Drawing Model 10
Exhibition Holiday
Drawing Model 11
Drawing Model 12
Drawing Model 13
Teacher's Institute
Drawing Model 14
Drawing Model 15
Easter Holidays
Drawing Model 16
Drawing Model 18
Match Safe
Drawing Board
Taboret
Drawing Board

PUBLIC SCHOOLS

TRAINING REGISTER

FRIDAY 130-300 School MUTCHMOR ST.

1908 1909

NAME	Age Class	Sept. 11 18 25	October 2 9 16 23 30	November 6 13 20 27	Dec. 4 11 18	January 8 15 22 29	February 5 12 19 26	March 5 12 19 26	April 2 9 16 23 30	May 7 14 21 28	June 4 11 18	Total
Robert Bannister	14 Sr IV	11	11111111111111	111	111·111	1·1111111						31
Robert Johnson	12 "	11	11111111111111111		1111111	··1111111						32
Willie Helman	13 "	11	11111111111111·11		1111111	111·····						28
Willie Moreland	14 "	1·	11111111111111111		1·1··11	1111·1·1						28
Paul Martin	13 "		11111·11··111111·1		1111111	·111·111						26
Murray Milne	13 "	11	11111111111111111		1111111	11111111						34
Charles Ogilyy	14 "	11	1111111111·111111		1111111	111111·1						32
Keith Steele	14 Jr IV	11	11111111111111111		1111111	11111111						34
Fred Liberty	13 "	11	11111111111111111		·11·11·	111111·1						30
Wilfred Graburn	12 "	11	11111111111·111		11·11·1	1·111111						30
Geo. Pennock	13 "	11	11111111111111111		11111·1	1·111111						32
Charles Skillen	12 "	11	11111111111111111		1111111	1 1111·1						32
Clarence Baker	11 "	1·	11·11111111·11111		1111111	11111111						30
Gordon McLennar	10 "	11	11111111··111··111		1111111	11111111						30
Colin Finlayson	12 "	11	11111111111111111		1111111	1111·111						33
Percy McKay	12 "	11	111 1111111111111		1111 11	11111111						32
Carl Cohoon	11 "	11	11111111111111111		1111111	11111111						34
Justin Faran	11 "	11	11111111111111111		11·1111	1·111111·						31
Willie Cowdrey	12 "	11	11111111111··11111		11111·1	1 · Moved						24
Percy Picken	12 "	11	11111111111111111		1111111	11111111						34

	19 17	Exhibition Holiday 20 20 19 19 20	19 20 20 19 18	19 18 18	19 17 19 19	Teacher's Institute 19	19 19	18 17 18 17	Easter Holidays 19	18 13	19 18 13 18	14 17	617
Total Daily Attendance													
Aggregate for Month	36	98	76	55	74	57	70	50	70	31			
Average for Month	18	196	19	183	185	19	175	166	175	155			
Number on Roll	19	20	20	20	20	20	20	20	19	18			

tools for the teacher. If possible, however a separate demonstration room* should be provided immediately adjoining the shop.

An abundant supply of light is a prime requisite for shop work. Light from above is best. Otherwise it may come from any side or from all sides. If the windows are placed 4 or 5 feet from the floor, there will be sufficient wall space for displaying panels, tool racks, charts, etc. The light should fall on the back and left-hand end of the bench or on both ends. When artificial light is needed, electric light is to be preferred, and one lamp properly guarded may be suspended over each bench or one or more electric clusters may be placed in the ceiling. In the former case, the lamp should be capable of being raised or lowered.

A special room about 18 feet by 18 feet should be provided for storage purposes adjacent to the shop, but material may be stored in the shop, where it does not interfere with the work. A store room is especially desirable where there is a large attendance of pupils. Lumber may be stored on end in a portion of the wall space, the various kinds and sizes being separated by pegs. Along one side of the storage room should be arranged 3 rows of pegs, each 1 foot apart and about 14 inches long. The first row should be placed 18 inches from the floor, the next 3½ feet, and the top 8 feet. This arrangement permits the different lengths and kinds of boards to be stored on end between the pegs, thus allowing a board of any required length to be readily selected. Along another wall should be ranged nests of pigeon holes extending from the floor to the ceiling, and providing storage for cut up material, nails, screws, hardware, etc. Doors should be provided to keep out the dust. If power is available, a circular saw may also be placed in the storage room to cut lumber into sizes suitable for class use, as it is more economical and convenient to buy the lumber in boards than in cut sizes. Finished work of small dimensions may be stored in the pigeon holes or in pigeon holes in the teachers' rooms; one pigeon hole, if possible, being allotted to each pupil. The size of each pigeon hole depends, of course, upon the size of the work generally constructed. They should be so arranged that one door will cover the work of one class. Finished work of large dimensions should be stored where suitable space is available.

Forge Shop.—The size of the forge shop depends on the number of forges to be installed; except in the larger cities, six are sufficient. Like the wood-working shop, the room must be adequately lighted and provided with storage accommodations for stock, fuel, and work. The light in the forge room should not shine directly on the anvil or forge. If it does, it makes it impossible to judge the proper heat of the metal. The north side of the school building is preferable, but, if possible, the forge room should be located in a one-story building with a large skylight. If the windows are a suitable distance apart, the forges may be placed between them along the wall; but an open space should be left in the centre of the room for vice bench, tool racks, etc. There should be a demonstration forge and anvil, blackboard, and tiers of seats for the pupils. The anvils should be set at such an angle to the forges that there will be plenty of elbow room and no danger

* "In the School of the Ethical Culture Society, New York, a special demonstration room is provided with desks, demonstration bench, and blackboards. A swinging blackboard is fitted into the wall, separating the demonstration room from the workshop. The working drawings of the piece of work under construction are drawn on the board, and when the class passes into the workshop the board is swung about a central pivot, and it then serves as a working plan for the class at the benches. When not in use for demonstration purposes, the room may be used as an ordinary class room. In this way convenient accommodation is provided for drawing the working plans which are ordinarily made at the bench."

Manual Training Room, Toronto Normal and Model School

of pupils interfering with each other. The floor should be concrete, but if wood is used (and it has some advantages) it should be properly protected under the forges and anvils, with sheet iron or zinc about 12 gauge.

Either of two kinds of forges may be used: (1) The hand blown, smoke burning, self cleaning, natural up-draft forge with overhead piping. (2) Down draft forge, pressure and exhaust blowers, with underground piping. The underground tile piping possesses many advantages over the system of overhead piping: it does not obstruct space and light, and is indestructible and entails no further expense after initial installation. The position of the forges should, of course, be planned before the floor is laid. If it is probable that at any future time additional forges will be installed, the tiling therefor should all be laid at once; for then the additional forge connections can be made without tearing up the floor.

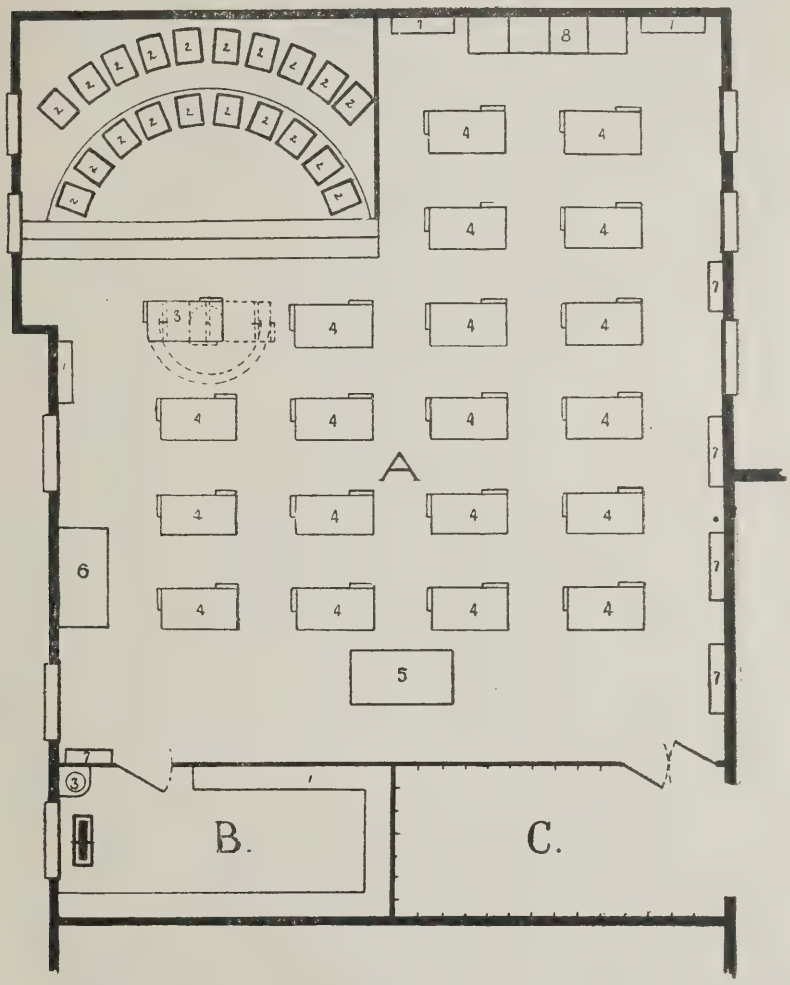
Machine Shop.—The floor of the room for machine shop practice should be of solid planking so that the lathes and other machines may be securely bolted to it. An auxiliary room is also needed for the storage of the numberless small tools; the shop check system of distribution of tools should be used. The machine shop should be well lighted from two opposite sides; the lathes should be placed along one side under the windows, and a bench fitted with vices for fitting, chipping and filing along the other. At one end should be a demonstration gallery provided with blackboard, a teacher's demonstration lathe, and tiers of seats. The centre of the room is thus reserved for other power machines, such as tool grinders, shapers, drills, etc. All machines are best driven by individual motors. When overhead shafting has to be used it should be hung in such a way as to prevent vibration in the room above.

Combined Forge and Machine Shop.—In the majority of schools in the Province it is neither necessary nor desirable to equip one shop for forge work and another for machine shop practice. Except in the cases where large industrial classes in these subjects are probable and the room will have to be used at night, a room combining the equipment of the two will suffice. In this case windows in every available space are desirable.

Blackboards.—Adequate and suitably placed blackboards are indispensable for all the workshops. For details of construction consult page 12 of the High School Regulations. Each should be equipped with chalk, compasses having a rubber or steel reversible point, and tee and set squares. The board should have one square edge on which a tee square may be used. This provision may be secured in one or other of two ways: Either by a sliding board in front of the fixed board, or by blocking out the centre section for a distance of 1 inch. The former is to be preferred, as it provides additional space. It also allows drawings or other work on the fixed board to be covered when desired. If one section of the blackboard is provided with vertical and horizontal lines an inch apart and with isometric angle lines, it will be of great service in making freehand dimensioned sketches.

Cloak Rooms and Lavatories.—Where the pupils in attendance are from a school immediately adjacent, special cloak rooms may not be needed; but, at centres to which they come from distant schools, cloak rooms and lavatories should be provided. For a statement of the requirements where special cloak rooms and lavatories are necessary, see High School Regulations, pages 10 and 12. A wash basin or trough with hot and cold water, soap and soap receptacles, and towels should be provided in each shop.

Emergency Cabinet.—A First Aid Emergency Cabinet should be provided in each shop, containing rolls of cotton and gauze bandages, absorbent cotton, surgical



PLAN OF MANUAL TRAINING ROOM

CREIGHTON STREET PUBLIC SCHOOL, OTTAWA

A. Classroom, 29′ 6″ x 33′.
1. Demonstration Gallery.
2. Chairs.
3. Reversible bench (as shown) for demonstration purposes.
4. Benches.
5. Desk.
6. Case for finished work.
7. Racks for general tools.
8. Lockers for boys' work.

B. Woodroom, 14′ 6″ x 6′ 9″.
1. Shelves for lumber.
2. Grindstone.
3. Washstand.

C. Cloakroom, 14′ 6″ x 6′ 9″.

and styptical gauze, tourniquet appliances, ointment for burns, bruises and cuts, antiseptic soap, and a book of emergency directions.

Teachers' Room.—A room of at least 8 by 10 feet should be provided for the teacher, furnished with a desk for correspondence, and with a cabinet for the filing of drawings, blue prints, etc. Where there are more than one teacher, a larger room is necessary. In such a room pigeon holes may also be provided for storing special work or for supplementing the usual storage facilities of the building.

Heating.—Sixty degrees will afford a good working temperature. A thermometer shall be provided for each shop. Where stoves are used, they shall be surrounded by a jacket of tin, zinc or galvanized iron, and every precaution taken to prevent the ignition of shavings or other refuse.

Ventilation.—Provision should be made for an adequate supply of pure air at all times. There should be a complete change at least three times an hour. In the forge room special provision is necessary for carrying off the products of combustion. If the forge itself does not make this, special attention must be given to the general system of ventilation. All windows should be made to open so that these may be used if necessary.

II. Household Science

School Kitchen.—For cooking, an oblong room should be provided. One 30 feet by 40 feet accommodates from twenty to twenty-four pupils and allows sufficient space between the tables and the walls. If the kitchen is in an ordinary school building, the top floor is most desirable, for it allows of better ventilation and prevents the kitchen odours from reaching the other rooms. A basement should never be used. The wall finish of the kitchen should be washable. The best finish is a dado of tiling with a painted wall above, but, if the cost is too great, the whole wall may be painted. Where a wall is much broken, painted burlap or table oilcloth may be used for the dado. The wall space should also be used for blackboards and cupboards, and the windows and doors should be placed accordingly.*

The woodwork should be stained rather than painted, or it may be finished in oil. It should be without grooves or projections, as these allow the accumulation of dust. Old woodwork must, of course, be painted.

Tiling makes the best flooring; good hardwood (maple) comes next, but if neither of these can be provided the floor may be painted or covered with inlaid linoleum. In this case the floor should, of course, be planed smooth.

As the school kitchen necessarily differs considerably from the home kitchen, some schools have fitted up a small room adjoining, with the home kitchen equipment of sink, ranges, cupboards, refrigerator, utensils, etc., to give home kitchen

* One of the most attractive school kitchens has been thus described: "The room is large and sunny, being provided on three sides with fourteen large windows, and has a floor space of 30 feet by 50 feet. The artistic effect of the room has been enhanced by a colour scheme of blue, white, cream, and mahogany, to suggest the style of an old Dutch kitchen. The walls are covered to the top of the doors with blue buckram so finished as to be easily cleaned. At the height of the doors a shelf extends around the room. The walls above the shelf and ceilings are of a deep cream colour. The windows are curtained with cream coloured shades and sash curtains of Russian crash in natural colour edged with blue fringed gimp. The doors and window-frames and shelf are painted ivory white, while the doors and base boards are mahogany colour. On the shelf is an interesting collection of vases, plates, jars, etc., representing the wares of different nations. Three large cupboards with leaded glass doors in Dutch style are built across the corners, and contain china in blue and white and a food museum."

practice. Here, sections of two or three girls work under the partial supervision of the teacher.

A store room is desirable as it makes possible the purchase of provisions in larger quantities, thus reducing expense. In this room closed cupboards having shelves of suitable width should be provided. If the shelves are movable the spaces may be adapted to the varying sizes of their contents. The store room and pantry should be closely adjacent to the kitchen and dining-room.

Dining Room.—A dining room 12 feet by 16 feet will afford ample space for class work. Too large a dining room is not economical. Here the wall finish need not be washable. A plate rail should be provided and a few good pictures hung from it. The floor should be of some hardwood, preferably oak, waxed and polished. The dining room should be furnished as much as possible like a home dining room, and should be close to the kitchen in order to avoid delay and waste of time in serving. The whole colour scheme and plan of furnishing should be settled before a start is made, in order that the result may be harmonious and artistic. In some schools the dining room furniture has been made by the advanced classes in Manual Training.

Sewing Room.—The earlier work in the sewing course is taken in the grade class rooms at the school desk. Sometimes where the work is taught by the Household Science teacher, the kitchen or dining room is used for the purpose. Where a separate room is provided, it must be well lighted, and, where used for evening classes also, an adjustable drop light should be suspended over each table and machine, or the direct or semi-indirect system may be used. Ample blackboard space should also be provided, and sufficient cabinets and cupboards for the storage of material and the work in progress. For fitting, one corner of the room should be provided with a mirror and screened from the rest.

Laundry.—A large amount of laundry work may be carried on in the school kitchen.* For some years in Ontario this is the most that can be expected. If, however, a Board decides to provide a separate laundry room, it should consult the authorities at the University of Toronto or the Macdonald Institute, Guelph, which have well equipped laundries.

Cloak Rooms and Lavatories.—Where the pupils in attendance come from a school immediately adjacent, special cloak rooms and lavatories may not be needed; but at centres where they come from distant schools, conveniences of the character prescribed under the High School regulations should be provided. Under no circumstances should clothes be hung in the kitchen.

Heating.—Generally speaking, the kitchen does not need to be heated to the same temperature as an ordinary class room, for a considerable amount of heat is given off from the cooking. A thermometer should be hung in the room and the temperature kept at about 65 degrees.

Lighting.—If the windows are well placed, light from the north may be more evenly distributed than where it is from the south. But sunlight adds to the cheerfulness of the room, and where the light is not from the north, window shades should be provided to regulate it.

Ventilation.—The ventilating system must be capable of regulating the temperature and removing the products of combustion and the odours arising from the cooking. To secure this promptly and effectively, the windows may be utilized, but with caution, as draughts may affect the gas flames and ovens. A simple method of ventilation is to place boards under the lower sash of the windows in order to direct the draught towards the ceiling, or screens of cheese cloth over

Dining Table, Toronto Normal and Model Schools

part of the lower sash space. The chimney may also be used if provided with suitable openings into the flue.

Blackboards.—The blackboards shall be of sufficient extent and of good quality (slate or ground glass preferred) properly placed in regard to light and distance from the floor, and furnished with troughs for chalk dust. There shall be a suitable supply of erasers for teachers and pupils, and the troughs and erasers shall be cleaned every day. *Every possible precaution should be taken against dust in the school room.*

Grade I shall be given only when the blackboard is slate or ground glass.

On one section of the board should be painted a list of all common food materials, headed "current prices," and these prices should be changed by the teacher as the market fluctuates.

An Apartment or a Suite of Rooms.—The ideal provision for the practical side of the Household Science course is a cottage or suite of rooms. Such suites may be seen in the Lillian Massey School of Household Science, Toronto, or the Macdonald Institute, Guelph; and such a suite is in actual use at 16 Orde Street, Toronto. Here Public School classes are taught general household management in addition to the more common cookery. In London a cottage formerly used by the caretaker was remodelled and now provides a school kitchen, a home kitchen, a bed-room, a bathroom, and a dining room. It is heated by a hot-air furnace, and so has all the conditions of an ordinary house. This plan is strongly recommended.

Equipment

5.—(1) Subject to the Minister's approval, the term "equipment" shall include any provision specially made for Manual Training and Household Science, as, for example, the tables, work benches, etc., as well as utensils, stoves, tools, forges, lathes, and other apparatus.

(2) The equipment listed below is recommended for Manual Training and Household Science in the Public and Separate Schools and the Lower School of the High and Continuation Schools and Collegiate Institutes respectively:

I. Manual Training

For the Forms I and II of the Public and Separate Schools the equipment should be as follows:—

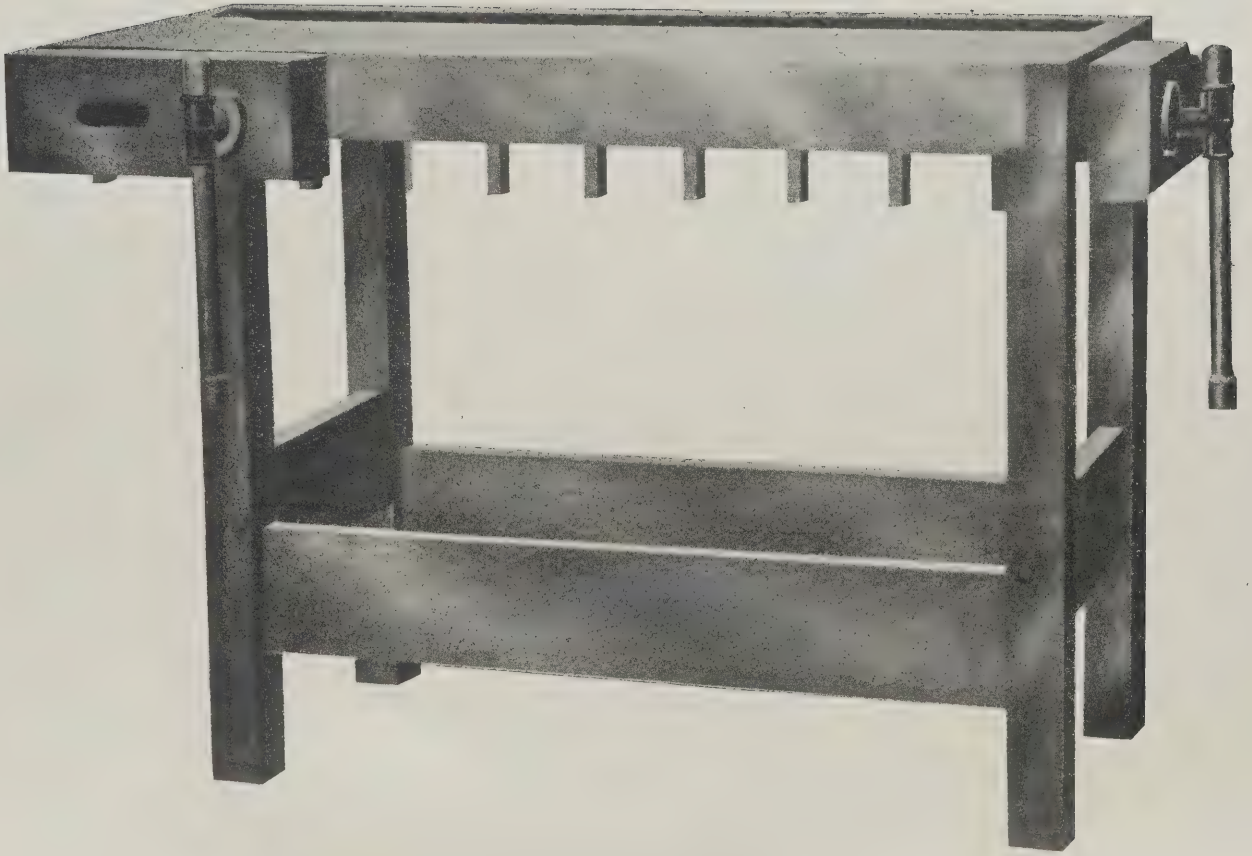
Modelling.—A quantity of clay or plasticine in different colours (a pound will provide sufficient material for six pupils), modelling boards, receptacle for storing clay, and a pail or wash bowl to contain water.

Paper Work.—Pencils, scissors, ruler graduated in inches, halves, quarters, and eighths, mill board for each pupil to protect the desk top, paste or other adhesive, and paper for drawing and construction.

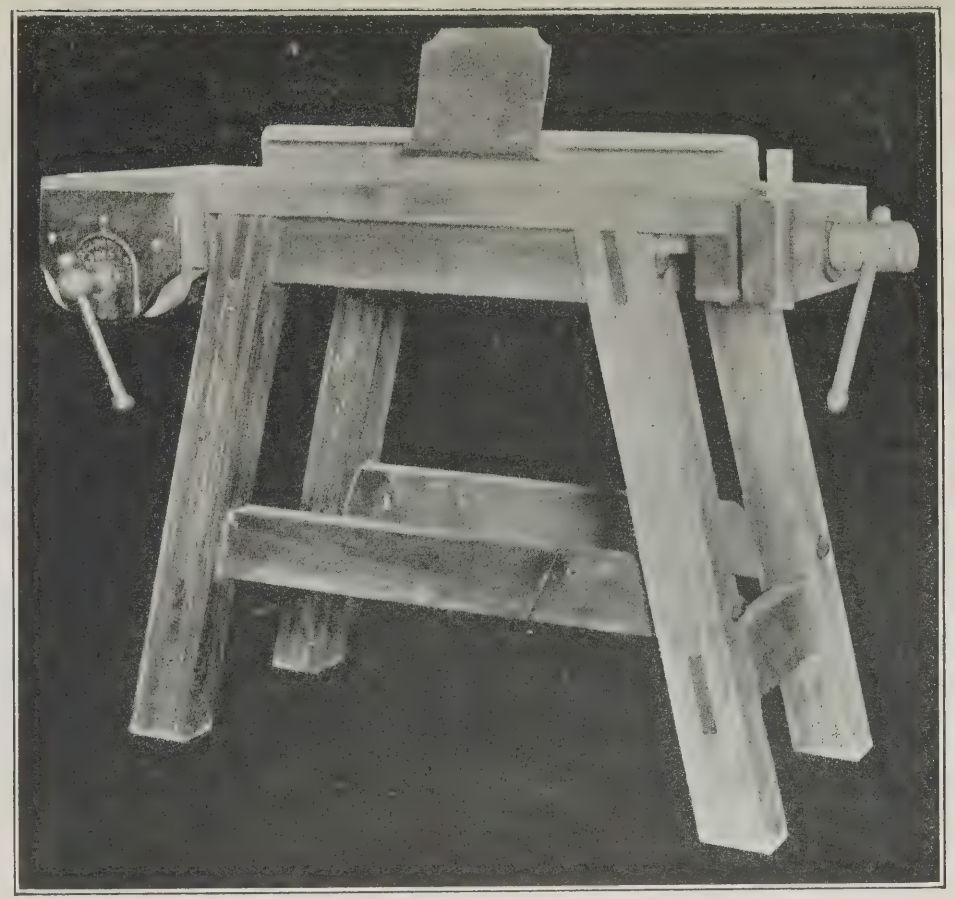
Weaving.—Materials for weaving such as raffia, wool, yarn, string, etc., and simple looms of cardboard.

Cardboard Work.—In addition to the equipment prescribed for paper work, knife, compasses, set square for each pupil, one ticket punch for every five pupils, and cardboard of various weights.

Knife Work.—Knife, pencil, ruler, compasses, try square for each pupil, three or four small hammers, two hand screws, oil stone, oil can, and assorted brad-awls for the class, and working material.



Manual Training Bench



Manual Training Bench

For Forms III, IV and V of the Public and Separate Schools and the Lower School of the High and Continuation Schools and Collegiate Institutes, the equipment should be as follows:

Wood-working Benches.—The benches should be placed in the best lighted part of the room in such position that the light may fall upon them from above or from the left. A space should be left between the benches to allow free passage to both pupils and teachers, with sufficient aisle space where there is a good deal of traffic. The minimum space between the back of one bench and the front of another is 30 inches; 3 feet, however is desirable. The benches may be single or double—preferably single—well and strongly made, rigid in action, and of selected, well-seasoned maple throughout, or at least with tops of that material. These provisions are especially necessary when the Manual Training benches are used for industrial evening classes. Adjustable benches, except those with steel frames, are never satisfactory. The tops of the benches should be formed of strips 1 inch to 2½ inches wide, glued and dowelled together. They should never be made of one piece. Each bench should have two vices, one at least a rapid acting one and the other with an iron screw. If the benches are provided with tool racks, the edges of the tools should be properly guarded, and the handles should project as little as possible above the top of the benches.

NOTE.—Benches should be bought from firms that make a specialty of their construction; others are seldom satisfactory.

The benches should be equipped as follows:

Bench Hook	$0 25	Firmer Chisel, plain, 1 inch and handle (octagon handles)	$0 24
Springfield Drawing Kit	50	Firmer Chisel, plain, ¼ inch and handle (octagon handles)	21
Pencil Compass	15	Firmer Chisel, plain, ¼ inch and handles, square edge	12
Drawing Rule, 12 inches long, inches and centimeters	20	Tenon Saw, 10 inches, 16 teeth to 1 inch	95
Bench Whisk	09		
Marking Gauge, No. 64½	27		
Try Square, No. 12, 6 inches	25		
Jack Plane	1 57		

The following tools for general use are also necessary:—

4 Smooth Planes	$7 80	1 Iron Rabbet Plane	$1 48
4 Try Squares, No. 12, 12 inches	2 07	1 Jointer Plane	3 40
1 Disston Improved Mitre Box, and Saw, 22 inches, 11 teeth to 1 inch	11 30	4 Gimlets, assorted sizes	20
2 File Cards and Brushes	50	6 Brad-awls, handled, fine size	25
6 Screw Drivers, round, 3 inches	1 50	4 Steel Scrapers, convex, 2 inches wide	80
2 Screw Drivers, round, 6 inches	60	10 Mallets, hickory, round heads	2 50
6 Half Round Files, handled, 8 inches	85	2 Firmer Chisels, 1-16 inch, handled, square edge	30
6 Flat Files, handled, 8 inches	68	2 Firmer Chisels, ⅛ inch, handled, square edge	30
1 Saw File, 4 inches and handled	10	2 Firmer Chisels, ¾ inch, handled, square edge	50
4 Braces, 6 inches sweep	4 40	2 Bevels, 8 inch sliding	55
2 Centre Bits, 1⅛ inches	24	2 Mortise gauges	1 20
2 " 1 inch	24	4 Nail Sets, knurled	30
2 " ¾ "	20	10 Iron Spoke Shaves	1 34
2 " ½ "	20	2 Wood Hand Screws, 10 inches	71
2 " ¼ "	16	4 Iron Malleable Clamps, 4 inches	94
2 Auger Bits, ¼ inch	40	2 Oil Stones, mounted, 8 inches	1 40
2 Auger Bits, ⅜ inch	40	2 Slips for gouges	10
2 Auger Bits, ⅝ inch	57	1 Brass Oil Can, No. 22	15
2 Countersinks, metal	10	2 Pairs Pincers, 6 inches	30
2 Countersinks, wood	10		

5 Pairs Wing Dividers	$1 05
1 Pair Cutting Pliers, side	34
1 Pair Round Nosed Pliers, 5 inches	20
10 Hammers, 13 oz., No. 2	6 25
2 Firmer Gouges, 1⅛ inches and handles, octagon, boxwood	50
2 Firmer Gouges, ½ inch and handles, octagon, boxwood	34
2 Firmer Gouges, ¾ inch and handles, incannell, boxwood	46
2 Firmer Gouges, ½ inch and handles, incannell, boxwood	42
4 Bent C Tools, 1 inch and handles, octagon, boxwood	1 20
4 Bent C Tools, ¾ inch and handles, octagon, boxwood	1 20
1 Hatchet	$0 35
1 Pad Saw, No. 5	20
2 Turning Saws, 10 inches	1 80
2 Turning Saws, 12 inches	1 80
4 Cross Cut Saws, 22 inches	4 40
4 Rip Saws, 22 inches	4 40
1 Cupboard, lower part fitted with drawers, upper part with glass panelled doors, made in white ash, polished.	49 45
1 Black Board, T-square, 2 set squares and compasses	4 00
1 Saw Bench	2 00
1 Tool Grinder	4 00
1 Teacher's desk and chair	10 00
Tool Racks	

Wood-turning.—Where wood-turning is carried on it will usually be in the wood-working room, and the lathes should be placed along one side under the windows. The lathe should have the following general specifications: 10-inch swing-over bed; length of bed, 3½ feet; distance between centres, 24 inches; weight, 250 lbs.; floor space over all, 3 feet 10 inches x 26 inches. Each lathe should be provided at the back with a shelf and tool rack. A comprehensive tool equipment for each lathe is as follows:—

Turning gouges, ½-inch and ¾-inch	$0 54
Flat Turning Chisels, 5-16-inch and ¾-inch	60
Round-nose Chisels, 5-16-inch and ⅝-inch	47
Square Chisels, ¼-inch and 1-inch	42
Parting tool, 3-16-inch	37
Paring Gouges, ½-inch and 1-inch	$0 94
Washita Oil Stone	49
Washita Slip Stone	03
Pair 6-inch Calipers	61
Oil Can	20
Dust Brush	23
Rule	20

Metal-working Benches.—More or less simple metal work is often introduced in connection with the course in wood work. The bench for this should be strongly built with a flat top constructed of strips, as prescribed above for the wood-working benches. It may be placed along one side of the room and equipped with one or two machinist's vices. A vice with an anvil cast with it will be most serviceable; this bench will also be useful in assembling larger work.

Glue and Stain Benches.—Though the use of cold liquid glue is becoming common, an ordinary gas ring, or small electric stove, properly protected, should be provided for preparing and heating glue. Glue, finishes, and stains should never be used at the wood-working benches. A cupboard, the front of which lets down to form a bench, covered with zinc, may be used for storing and using these materials.

Forge Shop.—Except in the larger cities six forges are generally sufficient. Each forge should be provided with the following:

1 anvil (100 to 125 lbs.) set on hardwood block, suitably bedded in the ground at least 18 inches; 1 toolstand, 14 inches by 21 inches by 27 inches high. This may contain three or more drawers for storage of work on which each boy is engaged: anvils cost from 10 to 12 cents per lb.

Also one each of the following: fire set; ¼-inch flat jaw tongs, 16 inches; ⅜-inch flat jaw tongs, 16 inches; ½-inch flat jaw tongs, 16 inches; ¾-inch flat jaw tongs, 16 inches; gad tongs, pick-up tongs, 1⅛ inches; hot chisel (square stock)

1⅛ inches; hammer (square face); flatter, 2 inches (square face); ¼-inch round hand punch; 1½ or 1¼-inch ball pein hammer; caliper rule; 1 centre punch.

The following tools for general use are also necessary: 1 hardie, 1 cold set, 1 pair ⅜-inch fullers, 1 pair ¾-inch fullers, 1 2 ft. brass rule, 1 pair 9-in. calipers, 1 pair 4-in. outside calipers, 1 steel square, 1 light forging hammer, 1 heavier forging hammer, 1 sledge hammer (8 lbs.) for every three pupils.

Machine Shop.—The work in this course falls naturally into three divisions:

(1) Ornamental Work in Brass and Copper.—The equipment needed is as follows: Anvils and hammers of various shapes, an annealing tray (if a forge is not available), a box large enough to hold 2 gallon stone jars, and about half a bushel of sawdust, a pair of blacksmith's tongs, cutting shears straight and curved, steel square, jeweller's saw frame, piercing saw, breast drill and assortment of drills, compasses, calipers, surface plate, assortment of files, sandbag or engraver's pad, pitch block, set of chasing tools and punches, set of dapping tools, a dapping die, flat, round nosed and pointed pliers.

(2) Chipping and Filing.—The equipment for chipping and filing consists of heavy benches fitted with machinist's vices, one for every boy under instruction at one time. The vices should be of various patterns, and each vice should be equipped with the following tools:

3-16-inch square file, 6 inches...	$0 08	4-inch spring divider	$0 31
Flat bastard file, 12 inches.....	17	3-inch steel scale	32
Hand Second cut file, 12 inches..	22	4-inch steel square	2 00
Half round bastard file, 10 inches	15	Centre punch	11
Smooth file, 7 inches	10	Scriber	12
Half round second cut file, 5 inches	09	Cold chisel	08
Pillar file, 6 inches	09	Cape chisel	15
Taper saw file, 6 inches	06	Round nose chisel	11
1-lb. hammer	45	Pair of copper vice jaws	75
File card	08		

(3) Lathe and Machine Work.—2 engine lathes 10 inches swing, 4 feet bed: 1 speed lathe 10 inches swing, 4 feet bed. Each lathe to be fitted with the necessary attachments driven by individual motor if possible, and supplied with the following tools:

Diamond point tool	$0 48	4-inch spring calipers	$0 31
Round nose tool	48	4-inch inside calipers	27
Side tool	48	6-inch steel scale	60
Parting tool	48	Centre gauge	20
Thread tool	48	Lathe dogs, ½-inch, ¾-inch, 1-inch and 1½-inch	1 52
Centre punch	11		

If the lathes are not driven by individual motors, the necessary shafting, pulleys, balls, and hangers must be supplied.

1 12-inch drill press with capacity to drill 1¼-inch hole, automatic feed.	1 Grindstone and trough.
	1 Power Hack Saw.

A small planer or shaper may be added if desired. In addition to the above the machine shop equipment comprises numerous small tools, too many to enumerate, and varying in quality and kind. These can be added as the work demonstrates their necessity.

Combined Forge and Machine Shop.—The following is a list of a combined equipment.

Engine Lathe	$236 75
One additional lathe to be provided.	
Grinding machine with two emery wheels	34 00
Wet Tool Grinder	155 00
Two Forges with Motors	128 00
No. 2 Power hack saw	$24 00
No. 16 back-geared Shaper	270 25
Two 90-lb. anvils	22 50
Sensitive drill	42 00
Back geared drill	80 00
12 bench vices	67 70

Illustrative Material.—As the rooms set apart for Manual Training are usually class rooms as well as workshops, the question of cultivating the taste of the pupils should not be lost sight of. Material may be obtained for this purpose, which is also illustrative of the shop work. Examples are: panels of specimen woods, cones from the various evergreens, pressed leaves of the hard woods, photographs of lumber industries, forest scenes, framed prints of the principal lumber furnishing trees, etc. Panels should also be provided with specimen tools, the parts of which have been separated and named. Specimens may also be obtained from manufacturers showing the steps in the manufacture of the tools; also blue prints used in the local factories.

Library.—Each Manual Training Centre should be furnished with a bookcase and a rack for magazines and illustrated catalogues. Many firms publish the latter richly illustrated with actual photographs, which can be used in teaching design and proportion. A scrap book in which to store drawings, cuttings, and photographs is also desirable.

Below is a list of suitable books of reference. Those marked with an asterisk are especially suitable for Public and Separate School Libraries; those with a dagger, for High School Libraries. Teachers will find both lists full of suggestive material; those marked § are especially useful.

I. ELEMENTARY

WEAVING AND BASKETRY

*Hand Loom Weaving. Todd. 90c. The G. M. Hendry Co., Ltd., Toronto.

Well illustrated, clear and concise directions for weaving many simple articles. Contains a useful list of helpful books and magazine articles.

*Practical and Artistic Basketry. Tinsley. $1.00. McClelland & Goodchild, Toronto.

Contains an outline of a course in basketry for the elementary schools. One of the clearest books on the subject, containing much not found elsewhere.

Baskets and How to Make Them. White. $2.00. McClelland & Goodchild, Toronto.

A standard work by a recognized authority. Materials fully described and full instructions given. Well illustrated.

Raffia and Reed Work. Knapp. 50c. The George M. Hendry Co., Ltd., Toronto.

Outlines a course from the kindergarten through the public school grades, in paper weaving, cardboard, raffia, etc. Well illustrated. All weaves clearly shown.

§Indian Basketry. James. $2.50. McClelland & Goodchild, Toronto.

A thoroughly comprehensive work. Over 600 illustrations, showing all the different weaves and stitches.

Primary Hand Work. Seegmiller. 50c. Educational Book Co., Ltd., Toronto.

Helpful and suggestive for the primary teacher. Deals largely with paper weaving for children six years of age and upwards. Forty diagrams.

*Varied Occupations in Weaving. Walker. $1.00. The Macmillan Company of Canada, Toronto.

One hundred and seventy-eight illustrations. Treats of various kinds of weaving in paper, ribbon, string, straw and cane.

PAPER AND CARDBOARD

Paper Sloyd for Primary Grades. Rich. 75c. Ginn & Co., New York.

Contains 47 drawings of cardboard models, divided into three years' work, and 14 supplementary models with full directions for making.

*Story Telling with Scissors. 50c. The Geo. M. Hendry Co., Ltd., Toronto.

An excellent little manual for primary work. Sixty-two plates, black on white, with appropriate verses.

*Busy Hands Constructive Work. Bowker. 60c. McClelland & Goodchild, Toronto.

Useful for primary teachers. Deals with a variety of materials. Work divided according to seasons.

Manual Arts with Scissors. Moran. 75c. The Geo. M. Hendry Co., Ltd., Toronto.

Contains illustrative free cutting exercises for each month. Well got up, and good for reference.

First Years in Handicraft. Kenyon. 70c. Baker & Taylor Co., New York.

A series of 50 simple articles in paper and thin cardboard, suitable for children from 7 to 11 years of age.

Paper and Scissors in the School Room. Weaver. 25c. The Geo. M. Hendry Co., Ltd., Toronto.

Two hundred and twenty-two illustrations; based on geometrical figures. Contains useful hints and suggestions.

Plan Book with Scissors and Paste. 25c. McClelland & Goodchild, Toronto.

A series of 50 drawings, white on black, as suggestions for paper cutting, with an introductory chapter of directions.

*Paper Modelling. Swannell. 2s. 6d. George Philip & Son, Ltd., London.

Very useful and suggestive, deals with common objects as found in every home. Something agreeably different from the ordinary exercises.

*Paper Folding for Schools. Hopkins. 9d. Charles and Dibble, 10 Paternoster Square, E.C., London.

Very useful pamphlet, containing instructions for making various articles (40) by simple foldings. Illustrated by numerous diagrams.

*§Paper and Cardboard Construction. Buxton and Curran. $1.50. McClelland & Goodchild. Toronto.

Covers book, box, card, and envelope problems for the first four grades and suggestions for equipment, supplies and methods.

CLAY

Modelling for the Standards. 40c. The Geo. M. Hendry Co., Ltd., Toronto.

Plastic Methods for Plastic Minds. 35c. The Geo. M. Hendry Co., Ltd., Toronto.

How to Use Plasticine. 15c. The Geo. M. Hendry Co., Ltd., Toronto.

Above books well illustrated. Most of the objects given could be modelled in clay, as well as plasticine.

*Modelling in Public Schools. Sargent. 75c. J. L. Hammett Co., 250 Devonshire Street, Boston.

§*A Manual of Clay Modelling. Unwin. $1.00. Longmans Green & Co., London.

Sixty illustrations of natural and common objects. Very helpful.

Clay Modelling. Holland. 75c. Ginn. & Co., New York.

Gives a progressive course of models for the grades. Contains a useful introductory chapter and 18 plates.

*Clay Modelling for Little Ones. Pearce. 9d. George Philip & Son, Ltd., London.

A useful manual, based largely on natural forms; good on method; well illustrated.

§*Clay Modelling. Fletcher. 3s. 6d. George Philip & Son, Ltd., London.

An educational occupation for young children, based on geometrical figures and natural objects. Closely correlated with geography.

§*Clay Work. Lester. $1.00 McClelland & Goodchild, Toronto.

Deals with plant form, human figure, story illustration, simple architectural ornament, titles, and elementary pottery.

VARIOUS MATERIALS

*Constructive Work. Worst. 75c. A. W. Mumford, 157 W. Adams Street, Chicago.

Manual training related to number work, history, literature, and nature study. A chapter on vegetable dyes. A very useful book.

Hand Work for Kindergarten and Primary Grades. Hoxie. 50c. The Geo. M. Hendry Co., Ltd., Toronto.

A useful book, dealing with wood work for primary grades, raffia weaving, etc., and the making of blue prints from leaves.

§*What and How. Palen and Henderson. $2.00. The Geo. M. Hendry Co., Ltd., Toronto.

Suggested "Time Table" given. Illustrations excellent. Exercises for special days. A very good book.

*Seat Work and Industrial Occupations. Gilman and Williams. 50c. The Macmillan Company of Canada, Toronto.

One of the best of the low-priced books.

§*School Drawing.—A Real Correlation. Daniels. $1.20. The Geo. M. Hendry Co., Ltd., Toronto.

Correlates drawing, sand and clay modelling, paper work, etc., with history, literature, geography, etc. Should be in every school.

Construction and Flying of Kites. Miller. 25c. McClelland & Goodchild, Toronto.

An exceedingly useful and interesting pamphlet for boys.

*Correlated Hand Work. Trybom and Heller. $1.25. The Geo. M. Hendry Co., Ltd., Toronto.

Correlates work in clay, paper, cardboard, etc., with the ordinary work of the schoolroom.

§*Occupations for Little Fingers. Sage and Cooley. $1.00. McClelland & Goodchild, Toronto.

Includes suggestions on the use of cord, string, raffia, and clay, sewing, paper cutting and folding, weaving, crocheting, knitting and the furnishing of a doll's house.

*Industrial Work for Public Schools. Holton and Rollins. 90c. Rand-McNally & Co., New York.

Eighty half-tones. A course of four years' work in various materials.

§How to Make and How to Mend. $1.00. The Macmillan Company of Canada, Toronto.

Arranged in dictionary form. Should be in every school and home.

*Industrial Social Education. Baldwin. $1.50. The Geo. M. Hendry Co., Ltd., Toronto.

Deals with practical school problems and the possibilities of the various handwork processes.

*The American Boy's Handy Book. Baird. $2.00. Charles Scribner's Sons, New York.

Three hundred and twenty illustrations. One of the best boy's books on "What to do and How to do it."

Home Mechanics for Amateurs. Hopkins. $1.00. Munn & Co., New York.

An excellent book for a boy with a turn for experiment.

Bird Houses Boys Can Build. Siepert. 50c. Manual Arts Press, Peoria, Ill.

§The Place of Industries in Elementary Education. Dopp. $1.00. University of Chicago Press, Chicago.

Offers much toward solving the problems of hand work in the grades, both lower and higher. Should be studied by every teacher.

§Year Books of Council of Supervisors of Manual Arts. 7 vols.; $3.00 each. Ed. D. Griswold, Hastings-on-Hudson, New York.

Deals with all forms of manual arts in the schools. Of the greatest value.

WOOD WORK

†Hand Work in Wood. Noyes. $2.00. McClelland & Goodchild, Toronto.

Covers logging, saw-milling, seasoning, measuring, hand tools, fastenings, equipment, joints, and furnishing. Three hundred and four illustrations. An excellent book.

†Wood Work for Beginners. Wheeler. G. P. Putnam's Sons, New York.

A very suggestive book. Deals with a variety of subjects, all interesting to boys. Thoroughly recommended.

§†Wood Work on Scientific Lines. Bailey and Pollit. 75c. McClelland & Goodchild, Toronto.

Contains a number of educational exercises, many of them being pieces of apparatus for elementary science. A very useful book.

†The New Education. Manual Training Wood Work. Wake. 10s. 6d. Chapman & Hall, Ltd., London.

Gives a three years' course in wood work for public schools. Good on method, leading to design and invention. Well illustrated.

Elementary Wood Working. Foster. 60c. Ginn & Co., New York.

Deals with tools and their uses. Second half of the book deals with timber and trees. One hundred and thirty-six illustrations.

Wood Working in the Common School. Hinckley. $1.00. The Geo. M. Hendry Co., Ltd., Toronto.

Deals with woodwork in the classroom, by the grade teacher. Two hundred and seventy-five drawings.

*Coping Saw Work. Johnson. 25c. McClelland & Goodchild, Toronto.

A useful book of suggestions for "Out of School" work.

†Timber and Tools. Wallace. $1.25. T. Nelson and Sons, Toronto.

Two hundred and eighteen pages. Deals with the constructions of tools and the application of timber to industrial purposes.

Elementary Wood Work. Selden. Rand-McNally & Co., Chicago.

Two hundred and six pages. Well illustrated. A series of 42 exercises. Tool operations, illustrated from photographs.

MAGAZINES

Manual Training and Vocational Education Magazine. $1.75. McClelland & Goodchild, Toronto.

§*School Arts Book. $1.75 School Arts Publishing Co., 120 Boylston Street, Boston.

Something to Do. $1.00. School Arts Publishing Co., 120 Boylston Street, Boston.

Industrial Arts Magazine. $1.50. Bruce Publishing Co., Milwaukee, Wis.

II. ADVANCED

Manual of Carpentry and Joinery. Riley. $2.00. The Macmillan Company of Canada, Toronto.

*Essentials of Wood Working. Griffiths. $1.00. McClelland & Goodchild, Toronto.

Deals with tools, materials, and processes. Numerous photographs and drawings.

†Problems in Wood Turning. Crawshaw. 80c. McClelland & Goodchild, Toronto.

Contains 25 plates, covering spindle, face plate, and chuck turning; gives the mathematical basis for the cuts used in turning; discusses principles of design as applied to objects turned in wood; clear, practical, and suggestive.

*Beginning Wood Work. Deuson. $1.00. McClelland & Goodchild, Toronto.

Describes in detail the fundamental processes of elementary bench work through making simple articles for school or home. Illustrated.

†Problems in Wood Working. Murray. 75c. McClelland & Goodchild, Toronto.

Forty plates, each plate a working drawing of problems that have been successfully worked by boys in all trades.

§†Problems in Furniture Making. Crawshaw. $1.00. McClelland & Goodchild, Toronto.

Thirty-two plates and 24 pages of text dealing with simple furniture problems that have been successfully worked in school shops.

†Art Crafts for Beginners. Sandford.

Describes and illustrates elementary processes in sheet metal work, leather work, pottery, basketry, bead work, bookbinding, and thin wood.

§†Bench Work in Wood. Goss. 70c. Ginn & Co., New York.

Two hundred pages. Deals with drawing, tools, and timber construction. A comprehensive and useful book.

†High School Manual Training in Wood. Ritchey. $1.50. American Book Co., New York.

Two hundred and twenty-three pages. An advanced book dealing with carpentry, cabinet making, wood turning, and pattern making.

†Elementary Turning. Sheldon. $1.00. Rand-McNally & Co., New York.

A series of 62 exercises on the lathe. Well illustrated by photographs. Describes lathe and tools.

§†Principles of Educational Wood Working. Binns and Marsden. 5s. E. P. Dutton & Co., New York.

Deals with both the educational and the practical sides of manual training. Treats of the construction and action of tools. A very good book.

§Wood Working. Hasluck. 9s. Cassell & Company, Ltd., Toronto.

§Cabinet Work and Joinery. Hasluck. 7s. 6d. Cassell & Company, Ltd., Toronto.

§Carpentry and Joinery. Hasluck. 7s. 6d. Cassell & Company, Ltd., Toronto.

The above three books are excellent reference books, and deal comprehensively with their subjects.

Joints. Crosby Lockwood & Son, London. 3s.

A scientific description of the methods of fastening used in the construction of various kinds of engineering and architectural work. The mechanical principle of each is emphasized.

Farm Shop Work. Brace and Mayne. American Book Co.

Problems in Farm Woodwork. Blackburn. $1.00. Manual Arts Press, Peoria, Ill.

METAL WORKING

†Elementary: Foundry Practice. Richards. $1.25. The Macmillan Company of Canada, Toronto.

†Pattern Making and Foundry Practice. Hand. $1.50. Frederick J. Drake & Co., Chicago.

§†*Copper Work. Rose. $1.50. Davis Press, Worcester, Mass.

A fully illustrated book for teachers and art metal workers. Describes processes fully.

†Forge Practice. Bacon. $1.50. John Wiley & Sons, New York.

Well illustrated. Gives in clear, brief terms a description of elementary forge processes.

§†Metal Working. Hasluck. 9s. Cassell & Company, Ltd., Toronto.

†Teachers' Handbook of Metal Work. Miller. 3s. 6d. Whittaker & Co., 2 White Hart Street, Paternoster Square, E.C., London.

Metal Spinning. Crawshaw. 25c. Manual Arts Press, Peoria, Ill.

Describes and illustrates tools and methods of working.

§†An Introduction to Metal Working. Pearson. 2s. John Murray, London.

One of the best elementary books. Well illustrated.

DRAWING

Classroom Practice in Design. Haney. 50c. McClelland & Goodchild, Toronto.

Deals with the teaching of applied design. Very suggestive.

†Problems in Mechanical Drawing. Bennett. $1.00. McClelland & Goodchild, Toronto.

A collection of problems gathered by a practical teacher. Divided into groups according to principle involved, and arranged in order of difficulty.

†Elements of Mechanical Drawing. Leeds. $1.50. D. C. Heath & Co., Boston, Mass.

†Geometrical Drawing and Design. Spanton. 60c. The Macmillan Company of Canada, Toronto.

Applied Mechanical Drawing. Matthewson & Stewart, $1.00. Taylor-Holden Co., Springfield, Mass.

†Perspective Sketching From Working Drawings. Matthewson. $1.00. School Arts Publishing Co., 120 Boylston Street, Boston.

An excellent manual, teaching how to translate the working drawing into a sketch of the complete object or part.

§Bases of Design. Crane. 6s. 6d. G. Bell & Sons, Ltd., London.

§Line and Form. Crane. G. Bell & Sons, Ltd., London.

Both these books are classics, and should be read and studied by every teacher.

Architectural Drawing. Edminster. $2.00. David Williams Co., New York.

Comprehensive and practical. Two hundred and thirty pages. One hundred and five full page plates.

§Science and Art Drawing: Complete Geometrical Course. Spanton. $3.00. The Macmillan Company of Canada, Toronto.

A standard work.

§†The Principles of Design. Batchelder. $3.00. Inland Printer Co., Chicago.

Probably one of the best books published on this subject.

†Design—The Making of Patterns. Hatton. 5s. Chapman & Hall, Ltd., London.

A clear and concise explanation of the principles of design, based on geometrical and natural forms, and their application to materials. Well illustrated.

†Mechanical Drawing. Cross. $1.00. Ginn & Co., New York.

A very useful book. Clear and comprehensive. Deals with working drawings, inking, machine sketching, orthographic projections, with full instructions.

GENERAL

Theory of Educational Sloyd. 3s. 6d. George Philip & Son, Ltd., London.

§Mechanics Own Book. E. & F. N. Spon, Ltd., 57 Haymarket, London, S.W.

Contains a mine of information respecting timber. tools, woodwork, metal work, polishing and varnishing, carving, turning, etc. A most useful reference book.

TIMBER

†Our Native Trees. Keeler. $2.00. McClelland & Goodchild, Toronto.

Well illustrated. Five hundred and thirty-three pages. Should be in the hands of every teacher.

§†*Principal Species of Woods. Snow. $3.50. John Wiley & Sons, New York.

Beautifully illustrated. Growth, grain, structure, and uses explained in plain language.

Wood and Forest. Noyes. $2.00. Manual Arts Press, Peoria, Ill.

§*Report on Forests of North America. Sergeant. $2.50. Government Printing Office, Washington, D.C. 9th Vol. of U. S. A. Census.

Probably the most useful reference work on timber published.

§†Timber. Roth. Bulletin No. 10, U. S. Department of Agriculture, Washington.

Exceedingly useful. Contains a valuable chapter on "How to distinguish the different kinds of wood."

A Primer of Forestry. Pinchot. 25c. Bull. 24, U. S. Department of Agriculture, Washington.

Eighty-seven figures. Forty-seven plates. Contains much information on the growth and protection of trees.

§†American Woods. Hough. $5.00. Lowville, N.Y.

Issued periodically. Ten volumes published. Each contains about 25 cards, with three different sections from the same tree, and full descriptions.

II. Household Science

Tables.—The arrangement of the work tables will depend on the size and shape of the room, the number of pupils to be provided for, and the position of the windows. The continuous table arranged in rectangular or hollow square form is frequently adopted, and has proved satisfactory, especially for small children. There should always be two openings in the continuous table—one facing the blackboard where the teacher usually stands, and the other directly opposite.

Height, minimum 30 inches for children, maximum 32 inches for adults.

Depth, minimum 20 inches for children, maximum 26 inches for adults. At least 24 inches should be allowed as working space for each pupil, but 30 inches or more is desirable.

A working drawing and design of the tables that are supplied to the Normal Schools may be obtained from the Department of Education, Toronto. These, however, should be modified to suit local requirements. Each table is fitted with drawers and shelves or cupboards. Partitions in the drawers allow each utensil its definite place. These partitions may be movable. For lining, white table oilcloth or wrapping paper may be used, the former being preferable; or the drawers may be shellaced or painted with white enamel. Shelves or cupboards are placed directly under the drawers for holding large utensils and cleaning materials. Doors to cupboards underneath the table may be hinged at the top or the sides. By far the best arrangement for these cupboards is a roll front, which does away with the inconvenient door and costs very little more. Provision is generally made also for a moulding or baking board under the table top and above the drawers. The table top should project at least one inch to protect the faces of the drawers and cupboards when cleaning. It is best made of maple as this keeps a good colour, is easy to clean, and does not readily absorb moisture, etc. The top should be made in the same way as is recommended for Manual Training benches, care being taken to prevent the opening of the joints, as when this occurs, the water used in scrubbing soaks through to the bake boards or into the drawers below. The individual stoves are usually placed on the top of the table, which should, accordingly, be protected directly under the stoves by a strip of aluminum carefully tacked down at the edges, or of slate, marble, specially toughened glass, or vitrified tiling. In addition to the cooking tables, a supply table should be provided for the centre of the rectangular space. This also may be fitted with cupboards underneath, but sufficient space should be left between

the cupboard and the floor to allow of effective sweeping. Where a separate dining-room is not provided, table service may be taught here. In such cases, two 10-inch boards are sometimes attached to the two long sides of the supply table in order to give room beneath to sit comfortably. A teacher's table, containing drawers and metal-lined receptacles for storing sugar and flour, is also required.

Seats.—Seats of some kind are a necessity. Stools, chairs with folding backs, or swing seats may be used. If stools or chairs are used, the legs should be rubber tipped in order to lessen the noise; they should be of a size which admits their being placed under the tables when not in use. The attached seats may be of wood with an iron bracket screwed to the leg of the table and swinging underneath when not in use. The rounds of these seats should be large enough to be comfortable.

Stoves and Ranges.—When practicable, both a coal and a gas range should be provided. A plain coal range with six holes and removable tops and suitable oven and dampers is necessary. The burners of the gas range should have drilled holes, and both burners and tops should be movable to admit of effective cleaning. The most convenient type of gas stove has a high oven which does not necessitate stooping. For school use the oven should not be directly over the gas rings. Some manufacturers are now making a combination gas and coal range and these are being satisfactorily used in some schools. They are especially useful where space is a consideration.

A fireless cooker should also be provided. A cheap one may be made of a large wooden box, barrel, or pail filled with excelsior, hay, or sawdust. In addition to the two ranges a small stove is required for each pupil. This may be gas, electric, kerosene, or de-natured alcohol. In some of the towns of the Province where gas is not available, small electric stoves are used with satisfactory results. The individual stoves should be so constructed that they may be removed entirely from the top of the table when not in use, in order that the top of the table may be satisfactorily cleaned. The top of the stove should be large and flat enough to hold the cooking utensils without upsetting. Hinged joints which allow the stove to be swung from the table are sometimes used, but in this case great attention should be paid to the joint as leakages frequently occur. The series of individual stoves should be provided with a tap to cut off the whole gas supply when necessary. The tap to each stove should be placed so that the pupil has not to put her arm over the flame in order to turn it off.

Sinks and Plumbing.—In every kitchen there should be at least two sinks, each provided with hot and cold water, and to prevent crowding of the pupils these should be as far apart as convenient. The best material is porcelain, though an iron sink enamelled may be used. Sinks should not be fitted into the work tables, for this prevents open plumbing; the space below the sink should never be enclosed. For taps, etc., nickel-plate is a good material. High faucets cause splashing, and spring taps should not be used. The S variety of trap should be used as it is easily opened. Drain boards should be provided. These may be of porcelain or wood.

Kitchen Utensils.—All utensils should be plain with smooth surfaces and without angles. The materials of which they are made are aluminum, enamel, tin, earthen or wood, according to the purpose for which they are required. Frying pans are usually iron or steel.

The following is a list of equipment recommended for a class of 24 for individual work:

I. CLASS TABLE

1. UTENSIL DRAWER:

24 plates, enamel, 9 inch	$0 70
14 " white crockery, 7 inch	80
24 bowls white crockery, 7 inch	3 60
24 bowls white crockery, 5½ inch	1 20
24 enamel bowls, 6 inch	2 40
24 popover cups	1 80
24 bakers, crockery (oval)	1 20
24 platters " (small)	1 50
24 sieves (wire bowl)	1 30
24 spoons, wooden	1 92
24 spatulas, wire handle	7 20
24 knives, paring	2 00
24 forks, Nevada silver	2 50
24 spoons, table, Nevada silver	2 50
48 spoons, tea " "	1 20
24 cups, measuring, tin	2 40

2. SUPPLY DRAWER:

12 boxes (for flour), tin,, oak grained	10 00
12 boxes (for sugar), tin, oak grained	7 50
12 cheese jars (for salt)	68
24 shakers, glass	2 40
24 bread tins	4 32
24 biscuit cutters	72
13 safety match-box holders	1 62

3. SUPPLY CUPBOARD:

12 double boilers	5 76
24 stew pans, tin cover, wooden knob	4 56
24 frying-pans	1 20
24 saucepans	2 16
12 knife-boards	1 80
12 meat boards	3 00
6 scrub basins	1 50
12 dish pans	6 00
12 rinsing pans	3 00
12 draining pans	3 00
6 tea-kettles	3 00
12 scrub-brushes	2 00
12 vegetable brushes	30
12 soap dishes	75
12 garbage crocks	96
24 asbestos mats	1 10

II. SINK AND WALLS

1 garbage pail, galvanized iron	1 00
1 waste-paper basket, willow (large)	75
1 soap dish	11
1 brush, hand	03
1 brush, scrub	17
2 basins, hand, enamel	40
2 basins, scrub, enamel	$0 50
1 dish pan	70
1 crock for washing soda	30
2 towel racks	1 50
1 clock	5 50
12 tablets for housekeeping rules	70

III. GENERAL EQUIPMENT

2 kettles, granite	1 50
1 tea-kettle, granite	85
1 saucepan	28
1 saucepan	35
5 covers, tin	25
1 pie pan	10
1 coffee-pot	32
6 saucepans, 1 qt. size, white enamel	1 08
1 double boiler	59
6 covers, tin	30
1 soup ladle, enamel	09
2 pudding dishes, white enamel	40
12 strainers and mashers	1 80
1 kneading pan	85
3 steamers	67
10 graters	1 00
2 vegetable baskets	30
6 potato mashers	48
4 muffin pans	60
24 patty-pans	20
12 Dover egg beaters	1 20
1 spice box	50
1 Japanned tray	25
24 wire toasters	2 40
1 egg spade	15
1 scale	3 10
1 freezer	3 00
1 cast-iron frying-pan	40
2 roasting pans	60
1 dripping pan	25
1 quart measure, granite	60
1 pint measure "	45
1 funnel, tin	05
4 basting sheets 7 x 17-inches	92
6 " " 10 x 10 "	1 08
24 cups and saucers	1 30
24 tumblers	1 50
6 platters	36
6 plates	34
6 pitchers, 1½ qt.	1 00
3 brown bowls, 2 qt.	75
2 brown bowls	25
nest of mixing bowls	
6 glass measuring cups	60
6 glass lemon reamers	60
6 tea-pots (pint)	1 50
1 covered crock	25
1 doz. 1 qt. fruit jars	65
1 " 2 qt. " "	75
1 " 1 pt. " "	55
1 meat chopper	3 10
1 bread knife	25
1 bread board	25
2 knives, French	85

2 spoons, granite	$0 21
1 fork, large wooden handle	15
2 can openers	20
1 corkscrew	25
1 bunch skewers	15
1 brush, pastry	05
1 knife sharpener	25
3 graters, nutmeg	09
1 box toothpicks	05
1 pad tissue paper	05
3 scissors	1 25
1 doz. jelly glasses	35
1 cream and sugar basin	30
24 rolling-pins	3 00
1 butter spade	15
1 file and catch	65
3 doz. test-tubes	90
1 " thermometers (Dairy)	2 50
2 lamp chimneys	30
1 bell	40

IV. KITCHEN LINEN

36 yards towelling (3 doz. dish towels)	5 40
16 yards towelling (4 doz. wash cloths)	2 40
13 yards check towelling (3 doz. dish cloths)	$1 60
6 yards towelling	75
6 " " (6 meat cloths)	60
1½ " flannelette (oven cloths)	23
12 " cheesecloth	60
1⅜ " denim (stove apron)	27
2 " flannelette (for polishing silver)	20
chamois	25

V. CLEANING CUPBOARD

1 stove apron	27
1 stove brush	25
1 dauber	10
3 whisk brooms	45
1 dust-pan	20
1 pair stove mitts	30
1 broom	45

VI. MISCELLANEOUS

1 "First Aid" cabinet	10 00
1 fire blanket	2 00

Dining Room.—The following list is recommended:

1. DINING-ROOM TABLE AND SIX CHAIRS:

Oak	$30 00

2. CHINA AND GLASS:

1 flower vase	25
1 dinner set Limoges china	15 50
1 doz water glasses	80
1 glass fruit set	1 50

3. SILVER AND STEEL:

2 doz. teaspoons	4 20
1 " dessert spoons	4 00
½ " tablespoons	1 15
1 doz. dessert knives	$4 50
1 " dessert forks	4 50
1 " dinner knives	4 50
1 " dinner forks	4 50
1 carving set	2 00
1 butter pick	20

4. LINEN, ETC.:

1 silence cloth	1 50
1 4-yard table-cloth	5 40
1 doz. napkins	2 75
1 centre-piece	40
2 doylies	50
2 tray cloths	1 00

Dining room table and chairs can, of course, be bought for less than the above prices. It would be better, however, to buy a good kitchen table than a cheap dining table. The dishes should be selected from "open stock" so that when breakages occur they may be replaced with the same kind of dishes. The china should be subdued in colouring.

Sewing Room.—Where sewing is taken in the ordinary class room by the grade teacher, the following equipment will be sufficient for each pupil:

A work box containing scissors, thimble, thread, cushion and pins, needles, measure and emery, and costing from 50c. to 75c. per set is required. The boxes may be made of millboard, or candy boxes may be used. A special cupboard should be provided to contain these boxes and the working material. A demonstration frame of coarse canvas and mounted on a stand is also desirable on which to teach the various stitch forms.

Where a special room can be provided, the following equipment will be sufficient for 15 pupils in dressmaking or 30 in sewing:

8 Tables at $3.00 each	$24 00

20 Chairs, $7.50 doz.	$12 50	4 Sewing Machines	$100 00
1 Stove (3 burners and tubing)	3 75	18 Tape Measures	3 60
6 Irons	1 50	33 Scissors (3 buttonhole)	9 40
4 Ironing Boards	3 60	6 Large Boxes, 40c.	2 40
1 Wardrobe	25 00	30 Small Boxes, 10c.	3 00
1 Mirror	10 00		

NOTE.—A less expensive table may be provided of boards supported on trestles. A convenient plan for the dressmaking tables is to have them hinged to the wall, so as to drop down when not in use.

Laundry.—The equipment given below is for laundry work carried on in the ordinary school kitchen as it is not probable that for some years separate laundries will be fitted up. In addition to the articles provided in the kitchen the following will be required:

1 Large Washing Tub	$0 83	6 Tables, 4 feet long	$5 40
12 Small Washing Tubs	7 20	8 Skirt Boards, $1.50	12 00
1 Pail	23	8 Small Wash Boards	3 20
4 Flat Irons, 7 lbs.	2 20	2 Clothes Horses	1 76
4 Flat Irons, 6 lbs.	1 80	3 Soft Brushes	1 14
8 Flat Irons, 5 lbs.	3 20	3 Whisk Brooms	54
8 Flat Irons, 4 lbs.	2 56	100 Feet Clothes Line	90
2 Polishing Irons	3 60	Clothes Pins	10
8 Iron Stands	40	Safety and Toilet Pins	25
8 Iron Holders, asbestos	32	1 Yard White Flannel	40
1 Large Wringer	4 25	10 Yards Cheese Cloth	40
2 Small Wringers	5 00	10 Yards Unbleached Cotton	80
1 Tin Dipper	20	4 Yards Cotton Felting (45 inches wide)	2 00
1 Clothes Basket	1 25		
1 Boiler	1 25		

Good work may, however, be done in the school kitchen with the following equipment:

24 Flat Irons, 1 lb.	$8 00	1 Clothes Line	$0 25
12 Polishing Irons, 1 lb.	4 00	1 Grey Blanket	3 00
26 Improved Handles	3 25	10½ Yards Cotton	1 05
14 Pony Wash Boards	1 75	6 Yards Cheese Cloth	30
72 Clothes Pins	10		

Home Nursing.—Home nursing can be taught in the class rooms if there is a space where a bed can be temporarily placed. A special cupboard should be provided to contain the small articles. Much may be done with a large doll's bed, with a large doll for the pseudo-patient. Where there is a cottage or apartment a bedroom is, of course, available. The following is a list of suitable equipment:

Bedstead, steel frame, white enamel, woven wire spring	$6 00	Oiled Muslin	$0 25
Mattress, sanitary	7 00	Rubber Tissue	25
Feather Pillow	75	Bed Tray	1 00
4 Cotton Sheets	4 00	Bed Rest	2 00
4 Cotton Pillow Slips	60	Hot Water Plate	75
1 Bed Spread	1 50	Feeding Tube	20
2 Single Blankets	4 00	Drinking Tube	02
Mackintosh, 1½ yards	1 10	Medicine Bottles, poison, etc.	25
Hot Water Bag	90	Medicine Dropper	02
Fountain Syringe	1 00	Medicine Glass (Graduated)	25
Muslin Bandages (7 yards muslin)	35	Minim Glass	75
Gauze Bandages		Eye Bath	20
Samples of Material for Flannel Bandages		Six oz. Graduated Glass	50
Samples of Material for Plaster Bandages		Eyelid Rod	06
Samples of Material for Rubber Bandages		Probe	50
Absorbent Cotton	10	Forceps	1 00
		Scissors	1 25
		Thermometer	1 00
		Thermometer, bath	10
		Foot Bath	1 00

Emergency Cabinet.—A First Aid Emergency Cabinet should also be provided, containing rolls of cotton and gauze bandages, absorbent cotton, surgical and styptical gauze, tourniquet appliances, ointment for burns, bruises and cuts, antiseptic soap, and a book of emergency directions.

Illustrative Material.—The teaching of Household Science may be greatly helped if appropriate charts and specimens are used. Examples of these are as follows: Charts showing the comparative nutritive and economic value of foods, and the different cuts of meat properly coloured. Home-made charts may be prepared from cuts in various bulletins and text-books. A bulletin board should be provided for the posting of current items of interest relating to household management. Specimens of foods and other material may be placed in jars or bottles, labelled and arranged in order on shelves. Such specimens may be obtained from large manufacturers, as, for instance, the makers of cocoa, flour, cereals, cottons, linens, etc.

Scientific Experiments.—If space will allow, a table for chemical and physical experiments may be placed at the side of the room. A suitable scientific equipment is as follows: 1 doz. 4 oz. beakers, 1 doz. ½-pt. flasks, 1 doz. 6-inch beakers, 2 doz. nests of test tubes (4, 5 and 6-inch), 1 doz. 2-inch watch glasses, 1 chemical thermometer, 1 microscope. Estimated cost, $35.22. If, when needed, a microscope can be borrowed from the High School, this cost will be reduced by about $27.00.

Housewifery.—The equipment given above is that generally provided, but for it the following may be substituted. This equipment is intended to combine the advantages of the "housewifery" centre with those of the ordinary cooking centre:

Gas and coal range, twelve tables in two rows of six tables each, facing each other with a sink at opposite ends—provided with swing seats, cupboards for containing utensils, supplies, etc., two drop leaf tables, six stationary tubs with three wringers covered with a top to be used as a cutting-out table, dining-room table and chairs, refrigerator, single bed, screen, two sewing machines and teacher's desk and chair.

Library.—Every Household Science department should be furnished with a reference library. Two or three of the best housekeeping magazines should be taken and the reading of the pupils should in all cases be directed. If a dining room is provided, it may be used as a reading room also when not required for table service. A school scrap book will be of service for keeping recipes and newspaper and other cuttings.

Below is a list of suitable books of reference. Those marked with an asterisk are especially suitable for Public and Separate School Libraries; those with a dagger, for High School Libraries. Teachers will find both lists full of suggestive material; those marked § are especially useful.

THE HOME

HOUSEHOLD MANAGEMENT. Manual, for Public and Separate Schools, Ontario Department of Education.

*†FURNISHINGS OF A MODEST HOME. Danniels. $1.00. School Arts Publishing Co. 120 Boylston Street, Boston.

This explains how to make a house artistic and comfortable at a small outlay.

*†CARE OF A HOUSE. Clark. $1.50. The Macmillan Company of Canada, Toronto.

A scientific explanation of the best methods of home-making.

*HOME MANAGEMENT. Hitching. 60c. W. & B. Chambers, Ltd., Edinburgh.

A systematic, detailed outline of home duties, helpful to teachers who have not been trained as specialists in Household Science.

†Home Economics. Maria Parloa. $1.50. Whitcomb & Barrows, Boston.

Home Decoration. Priestman. $1.50. Whitcomb & Barrows, Boston.

*When Mother Lets Us Help. Johnson. 75c. McClelland & Goodchild, Toronto.

An illustrated "Primer" in Household Science.

§Home Economics. Campbell. $1.50. Whitcomb & Barrows, Boston.

An exhaustive treatise on the home, from its building to the best care of its occupants.

HYGIENE AND SANITATION

*Body at Work. Jewett. 50c. Ginn & Co., New York.

*Control of Body and Mind. Jewett. 50c. Ginn & Co., New York.

*Good Health. Jewett. 40c. Ginn & Co., New York.

Hutchison's Handbook of Health. Hutchison. $1.25. McClelland & Goodchild, Toronto.

*The Body and its Defenses. Jewett. 65c. Ginn & Co., New York.

*Town and City. Jewett. 50c. Ginn & Co., New York.

These books teach the laws of health in a very simple and interesting way.

§Notes on Military Sanitation. Wellington. 20c.

§Home Hygiene. Sykes. 40c.

Both the preceding are text-books of the St. John Ambulance Association, Toronto.

§Health, Strength & Happiness. Saleeby. $1.50. Grant Richards, Ltd., London.

How to be Healthy. Halpenny and Ireland. 50c. The Educational Book Co., Ltd., Toronto.

Air, Water, and Food From a Sanitary Standpoint. Richards. $2.00. John Wiley & Sons, New York.

†Chemistry of Cooking and Cleaning. Richards and Elliott. $1.00. Whitcomb & Barrows, Boston.

Explains the reasons for common household duties, and gives useful instruction concerning them.

*Home Sanitation. Richards and Talbot. 25c. Whitcomb & Barrows, Boston.

A book of simple questions and answers, making ideas of sanitation very plain.

†Sanitary and Applied Chemistry. Bailey. $1.40. The Macmillan Company of Canada, Toronto.

This book applies the knowledge gained in High School Chemistry to the home and is for more advanced students and teachers.

†Story of Germ Life. Conn. 35c. Whitcomb & Barrows, Boston.

A simple outline of microscopic life, with illustrations.

*Household Foes. Ravenhill. 75c. Sidgwick & Jackson, Ltd., London.

A very useful book for younger students, explaining in a simple way the necessity of sanitation.

§†Clean Milk. Belcher. $1.00. McClelland & Goodchild, Toronto.

A book requiring some scientific knowledge.

FOOD AND DIETETICS

†Care and Feeding of Children. Holt. 75c. McClelland & Goodchild, Toronto.

*First Lessons on Food and Diet. Richards. 30c. Whitcomb & Barrows, Boston.

A series of ten lessons covering such topics as Food for the Child, The School Luncheon, What Shall We Eat as a Family? etc.

†Food Products of the World. Green. $1.50. Whitcomb & Barrows, Boston.

A useful book of information for teachers, showing the origin and manufacture of food materials.

†Food Materials and Their Adulteration. Richards. $1.00. Whitcomb & Barrows, Boston.

An accurate and clear account of food adulteration without much technical language.

§†Food and Dietetics. Hutchison. $3.00. William Wood & Co., 51 Fifth Ave., New York.

A detailed work containing the latest authentic ideas in dietetics from the standpoint of the physician.

†Human Foods. Snyder. $1.25. The Macmillan Company of Canada, Toronto.

A treatise on the composition and dietetic value of the common foodstuffs.

§Chemistry of Food and Nutrition. Sherman. $1.35. The Macmillan Company of Canada, Toronto.

One of the latest excellent books; requires previous technical knowledge; suitable for advanced students.

Principles of Human Nutrition. Jordan. $1.75. The Macmillan Company of Canada, Toronto.

One of the new books, embracing in one volume a wide range of topics related to human nutrition, interspersed with valuable plates. Suitable for teachers and advanced students.

*†Selection and Preparation of Food. Bevier and VanMeter. 75c. Whitcomb & Barrows, Boston.

A laboratory guide, teaching the principles of cookery.

†*Farmers' Bulletins.—Nos. 29, 34, 74, 85, 93, 112, 121, 128, 142. 5c. each. Superintendent of Documents, Washington. A P.O. order should accompany the application.

†*Bulletins, Nos. 146, 160, 162, 180, 181, 183, 184, 185. 5c. each. Ontario Department of Agriculture, Toronto.

Small pamphlets, each giving systematic experimental knowledge of some foods.

Farm Dairying. Laura Rose. $1.25. McClelland & Goodchild, Toronto.

Suitable for rural districts, being practical and authoritative on subjects of "Milk" and "Cheese."

COOKING AND SERVING

†*Boston Cooking School Cook Book. Farmer. $2.00. McClelland & Goodchild, Toronto.

An excellent book of recipes and studies of food.

†Cook Book for Nurses. Hill. 75c. Whitcomb & Barrows, Boston.

A book of recipes and menus for invalid cookery.

†Diet in Disease. Pattee. $1.00. Whitcomb & Barrows, Boston.

A technical work in dietetics, containing suitable recipes.

†Elements of the Theory and Practice of Cooking. Williams and Fisher. $1.00. The Macmillan Company of Canada, Toronto.

This book contains experiments and recipes illustrating plain cookery and is most useful to teachers and older students.

Fireless Cookbook. Mitchell. $1.25. Whitcomb & Barrows, Boston.

†Just for Two. Langdon. $1.20. H. W. Wilson Co., Minneapolis, Minn.

A useful book relating to housekeeping in a small family.

†Practical Cooking and Serving. Hill. $2.00. McClelland & Goodchild, Toronto.

A useful book of modern ideas on entertaining.

Invalid Cookery. Macbeth. 50c. Hospital for Sick Children, Toronto.

In this book of recipes, individual quantities are given for class work.

HOME NURSING

§The Expert Cleaner. Seaman. 75c. McClelland & Goodchild, Toronto.

*†Laundry Manual. Balderstone and Limerick. 50c. Avil Printing Co., Philadelphia.

*†The Art and Practice of Laundry Work. Rankin. 1s. 6d. Blackie & Son, Ltd., London.

†The Science of Laundry Work. Rankin. 1s. 6d. Blackie & Son, Ltd., London.

*Emergencies. Gulick. 40c. Ginn & Co., New York.

First Aid to the Injured. Cantlie. 40c.

A text-book of the St. John Ambulance Association, Toronto.

*†Home Nursing. Harrison. $1.00. The Macmillan Company of Canada, Toronto.

This book explains in a concise, systematic form the essentials of nursing, and is an excellent one of its kind.

§Hints and Helps for Home Nursing and Hygiene. Cosgrave. 40c.

A text-book of the St. John Ambulance Association, Toronto.

SOCIOLOGY AND ECONOMICS

†Cost of Food. Richards. $1.00. Whitcomb & Barrows, Boston.

†Cost of Living. Richards. $1.00. Whitcomb & Barrows, Boston.

†Cost of Shelter. Richards. $1.00. Whitcomb & Barrows, Boston.

The purpose of these three books is to emphasize the real essentials of life and to show that much money is spent without bringing a fair return.

§†Euthenics (The Science of Controllable Environment). Richards. $1.00. Whitcomb & Barrows, Boston.

The definition of euthenics given by the writer explains this book: "The betterment of living conditions through conscious endeavour, for the purpose of securing efficient human beings."

§Home Problems From a New Standpoint. Hunt. $1.00. Whitcomb & Barrows, Boston.

†How to Keep Household Accounts. Haskin. $1.00. Harper & Brothers, New York.

†The Woman Who Spends. Richardson. $1.00. Whitcomb & Barrows, Boston.

The value of this book lies in the interesting way in which it brings out our "vital needs" and our responsbility in using our income to meet them.

NEEDLEWORK

Sewing. Manuals for Public and Separate Schools, Ontario Department of Education, 20c.

§Domestic Art in Woman's Education. Cooley. $1.25. Charles Scribner's Sons, New York.

§Handicraft for Girls. McGlauflin. $1.00. Manual Arts Press, Peoria, Ill.

§How Shall the Little Ones Sew. Johnston. 25c. University Extension Society, New York.

Every sewing teacher should own this.

§Manual of Needlework and Cutting Out. Walker. 3s. 6d. Blackie & Son, Ltd., London.

§Practical Home Millinery. Reeves. $1.00. Longmans Green & Co., Ltd., London.

Practical Home Sewing and Dressmaking. Short. $1.00. Blackie & Son. Ltd., London.

†School Needlework (Teacher's edition). Hapgood. 75c. Ginn & Co., New York.

*†School Needlework (Pupil's edition). 50c. Ginn & Co., New York.

MISCELLANEOUS

†Fuels of the Household. White. 75c. Whitcomb & Barrows, Boston.

The book is an interesting discussion of the origin, composition, and uses of fuels.

Good Housekeeping Magazine. $1.50 per year. 381 Fourth Avenue, New York.

The best Household Science magazine for general readers, containing wholesome short stories and the latest ideas in all branches of home-making.

The Journal of Home Economics. $2.00 per year. 525 W. 120th Street, New York.

A technical magazine containing the most recent news of Household Science. Suitable for teachers and older students.

Industrial Arts Magazine. $1.50. Bruce Publishing Co., Milwaukee, Wis.

†THE LIBRARY OF HOME ECONOMICS

The following volumes, known as "The Library of Home Economics," and published by Whitcomb & Barrows, Boston, cover the entire scope of the study of Home Economics in simple, concise, and readable form, and may be used as a school library when the more expensive books listed above cannot be purchased:

Care of Children. Cotton. $1.25.
Chemistry of the Household. Dodd. $1.25.
Food and Dietetics. Norton. $1.25.
Home Care of the Sick. Pope. $1.25.
Household Bacteriology. Elliott. $1.25.
Household Hygiene. Elliott. $1.25.
Household Management. Ferrill. $1.25.
Textiles and Clothing. Watson. $1.25.
Personal Hygiene. Le Bosquet. $1.25.
Principles of Cookery. Barrows. $1.25.
Study of Child Life. Washburne. $1.25.
The House. Bevier. $1.25.
Or $12.00 for the set.

III. Minimum Equipment

6.—(1) The minimum equipment for Manual Training shall be as follows:—

(*a*) For High and Continuation Schools and Forms III, IV, and V of the Public and Separate Schools:

Wood-working: 12 single benches with the necessary tools, and equipment for mechanical drawing.

Wood-turning: 3 wood-turning lathes and band or circular saw with the necessary power and tools.

Ornamental Metal Work: A complete equipment for elementary work in brass and copper.

(*b*) For the Lower Schools of High and Continuation Schools, in addition:

Forging: 3 forges with anvil and tools.

Machine-Shop Practice: 1 engine lathe, 1 speed lathe, 6 bench vices } with accompanying tools.
Hack saw (power).
Drill (power).

(2) The minimum equipment for Household Science in Forms III, IV, and V of the Public and Separate Schools and the Lower Schools of the High and Continuation Schools shall be as follows:—

Cookery, Sanitation, and Hygiene: Tables, stoves, and utensils sufficient for the instruction of 12 girls at one time.

Hand and Machine Sewing: Two sewing machines with sewing and drafting tables sufficient for the instruction of 12 girls at one time.

Laundry: Provision for the instruction of 12 girls at one time in washing, drying, starching, and ironing.

(3) A library selected, with the Minister's approval, to a minimum value of $50 for Manual Training and Household Science respectively.

Legislative Grants

7.—(1) The Legislative Grants for each centre shall be apportioned as follows:—

(*a*) An Annual General Grant for Manual Training of $200 and for Household Science of $120.

(*b*) Ten per cent. of the annual expenditure for teachers' salaries over $600, to a maximum of $200.

(*c*) (i) For Manual Training, for the first year, 40 per cent. of the value of the equipment to a maximum of $360 in the case of Public Schools and $520 in the case of High and Continuation Schools; and for each of the three years following, 20 per cent. to a maximum of $180 and $260 respectively.

(ii) For Household Science, for the first year, 40 per cent. of the value of the equipment to a maximum of $400; and for each of the three years following, 20 per cent. to a maximum of $200.

(*d*) An Annual Grant on the character of the special accommodations according to the following scheme of grades:

(i) (*a*) For Manual Training in Forms III, IV, and V of the Public and Separate Schools and the Lower Schools of High and Continuation Schools:

	I	II	III	IV
Wood-working and Wood-turning Shop	$10 00	$7 50	$5 00	$2 50
Stock Room	5 00	3 75	2 50	1 25
Teachers' Room	3 00	2 75	1 50	75
Blackboards	2 00	1 50	1 00	50
Lighting	2 00	1 50	1 00	50
Heating	2 00	1 50	1 00	50
Ventilation	2 00	1 50	1 00	50
Cloak Rooms and Lavatories	4 00	3 00	2 00	1 00

(*b*) For the Lower Schools of High and Continuation Schools:

	I	II	III	IV
Forge Shop	$10 00	$7 50	$5 00	$2 50
Machine Shop	10 00	7 50	5 00	2 50
Combination Forge and Machine Shop	15 00	11 25	7 50	3 75

(ii) For Household Science in Forms III, IV, and V of the Public and Separate Schools and the Lower Schools of High and Continuation Schools:

	I	II	III	IV
Kitchen	$10 00	$7 50	$5 00	$2 50
Pantry, Cupboard, and Storeroom	5 00	3 75	2 50	1 25
Dining Room	10 00	7 50	5 00	2 50
Sewing Room	10 00	7 50	5 00	2 50
Teachers' Room	3 00	2 75	1 50	75
Blackboards	2 00	1 50	1 00	50
Lighting	2 00	1 50	1 00	50
Heating	2 00	1 50	1 00	50
Ventilation	2 00	1 50	1 00	50
Cloak Rooms and Lavatories	4 00	3 00	2 00	1 00

(2) In the apportionment of the grant for Manual Training, the maximum recognized value of the equipment for each department shall be as follows:

(*a*) For Forms III, IV and V, of the Public and Separate Schools and the Lower Schools of High and Continuation Schools:

Wood work, $500.
Wood-turning, $300.
Library, $100.

(*b*) For the Lower School of High and Continuation Schools:

Forging, $500.
Machine Shop Practice, $800.

(3) In the apportionment of the grant for Household Science, the maximum recognized value of the equipment for each department shall be as follows:—

Cookery, Sanitation, and Hygiene, $500.
Hand and Machine Sewing, $250.
Laundry Work, $150.
Library, $100.

(4) (*a*) No grant will be made for Manual Training unless at least provision has been made in Forms III, IV, and V, of the Public or Separate School, as the case may be, for wood working and the associated drawing, or for Household Science unless at least provision has been made in the same Forms for sewing, cookery, sanitation, and hygiene.

(*b*) The grants provided for above are made on condition that the elementary work prescribed in the curriculum for Forms I and II, of the Public and Separate Schools, is satisfactorily done. If time has to be spent in the Manual Training or Household Science room on work that should have been done in the lower grades, the grants will be reduced.

(*c*) When the provision for the above courses is less than the time of one teacher for five hours and a half for each of five days a week, the General Grant under (1) (*a*) above will be correspondingly decreased; when it is greater, it will be correspondingly increased.

(*d*) No grant will be paid on the equipment of a Manual Training or Household Science Centre in which there has been no class for more than one year.

(*e*) On the report of the Inspector that the equipment or the accommodations are inadequate or unsuitable, or that one or more members of the staff are inefficient or not legally qualified, such reductions may be made in the general grant and in the grants payable upon the equipment, the accommodations, and the salaries of the staff, or the whole grant may be withheld, as the Minister may deem expedient.

(*f*) The accounts of the Manual Training and Household Science Departments shall be separately reported each year to the Minister, and the Legislative grants therefor shall be spent wholly for the purposes of Manual Training and Household Science. The totals of the receipts and expenditures shall, however, also be included in the General Financial Statement of the Board to the Department of Education.

EVENING AND SUMMER CLASSES

8.—(1) No evening or summer class will be recognized by the Department of Education which has not a total enrolment for each of (*a*) boys and (*b*) girls, of at least ten members in regular attendance from the beginning to the end of each session.

(2) Evening Classes in Manual Training and Household Science are not intended for workmen and workwomen, and they may be taken only by those who are not on the roll of a Day School or those on such roll for whom provision has been made in 11 (2) of the Public and Separate School Regulations and 4 (2) of the High School Regulations.

(3) Where the Regulations for the establishment and maintenance of Evening Industrial Classes are complied with, the Advisory Industrial Committee may also admit to them pupils who are not engaged in the trades, but not *vice versa*.

NOTE.—**The evening classes in forging and machine shop practice, with the associated subjects, shall be established and maintained under the control of Advisory Industrial Committees.**

Sessions

9.—(1) (*a*) The session for an evening class shall consist of two terms, the first beginning in September or October and ending the last fortnight in December, and the second beginning in the first week in January and ending in April, at dates to be selected by the School Board and approved by the Minister.

(*b*) The classes shall be open for at least one hour and a half of actual instruction on each of at least two evenings a week.

(2) Subject to the approval of the Minister, the session of a summer class shall consist of one term of at least four weeks, and of daily sessions of at least four hours.

Accommodations and Equipment

10. So far as may be necessary, the equipment and accommodations provided for the Manual Training and Household Science of the Day Schools shall be used for the Evening and Summer Schools.

Legislative Grants

11. The Department will pay the following proportions of the total salaries of the staffs of the Household Science and Manual Training Evening and Summer classes:—

In cities with a population of 150,000 and over, one-sixth; in other cities, one-third; in towns, one-half; and in villages, two-thirds.

SPECIAL REGULATIONS FOR VILLAGE AND RURAL SCHOOLS

I. MANUAL TRAINING

Accommodations

12. The following description of the Manual Training accommodations applies to the schools provided for below, the Manual Training of the lower forms being taken at the school desks:

Wood-working.—The accommodation may be of three kinds: first, a small room adjoining the school room; second, a part of the school room itself; third, a basement or shed. Where space will permit, provision may be made in the school room by fitting a continuous bench with a top 18 inches in width and about 2 feet 7 inches in height. A length of 8 feet will accommodate five boys working at one time. These benches are best placed under the window.

A chest or cupboard should be provided to hold the above general tools, which should be so placed that their cutting edges are protected.

Before every vacation, both bench and general tools should be wiped with an oily rag and placed carefully away, out of the reach of damp, in order that rust may be avoided. When it is desirable to save space, a tool cupboard may be conveniently fitted within the framing of the bench.

The Board shall also provide facilities for storing the necessary tools, materials, and other requisites.

Equipment

13. In addition to the equipment for modelling, paper work, weaving, cardboard work and knife work described on page 17, there should also be provided for:

Wood-working.—(1) The following set of tools for each bench or bench place:

Bench hook, drawing kit, pair of compasses, rule 2 ft., marking gauge, try square, jack plane, firmer chisel 1-in., firmer chisel ½-in., firmer chisel ¼-in., tenon saw, bench whisk. Estimated cost, $5.00.

(2) The following general tools:

Smoothing plane, try square 12-in., two screw drivers, two braces with assorted bits, metal and wood countersinks, two gimlets, two brad-awls, one bevel, one mortise gauge, two nail sets, one wood hand screw, one pair pincers, one pair wing dividers, one pair cutting pliers, four hammers, one hatchet, one pad saw, one rip saw, one cross-cut saw, one oilstone. Estimated cost, $10.50.

In addition to the above general equipment, every school should have a large tee square, two set squares, 45° and 60°, a graduated rule and a pair of compasses for blackboard use.

Note.—Much of the work in Elementary Manual Training may be done out of schools hours, but definite provision, satisfactory to the Inspector, must be made in the time-table. While the teacher of manual training in the rural schools will be guided by the principles laid down in the curriculum, the models made and the work done must be given a definite relation to the requirements of the farm and farm home. From the very first this should be kept in view. The early lessons in clay, paper, cardboard and thin wood may be made to illustrate (1) Activities of the home, such as washing, baking, cleaning, churning, etc.; (2) Objects found on the farm, such as animals, implements, troughs, barns, sheds, poultry, horses, coops, etc.; (3) Foods and their preparation, such as milk, milkmaids, stool and pail, cows, butter-

making, cheese-making, etc.; (4) Transportation wagons, buggies, wheelbarrows, sleighs. The woodwork can be made of service both in farms and homes. Articles of definite use such as the following are suggested—plant labels, match scratchers, picture frames, weather vanes, axe handles, hammer handles, chicken coops, dog kennels, stools, boxes, brackets, shelves, match boxes, wash bench, ironing board, window screens, hay rack, small steps, fruit ladder, single tree and other articles necessary in the practice of agriculture. Small repairs should also be undertaken, such as putting in a broken window, splicing ropes, mending gates and fences, etc. The objects made at school will of necessity be small and the larger articles will have to be made at home. There should be the closest co-operation between the school and the home and when possible the teacher should supervise the home work and give credit for it in the school record.

Legislative Grants

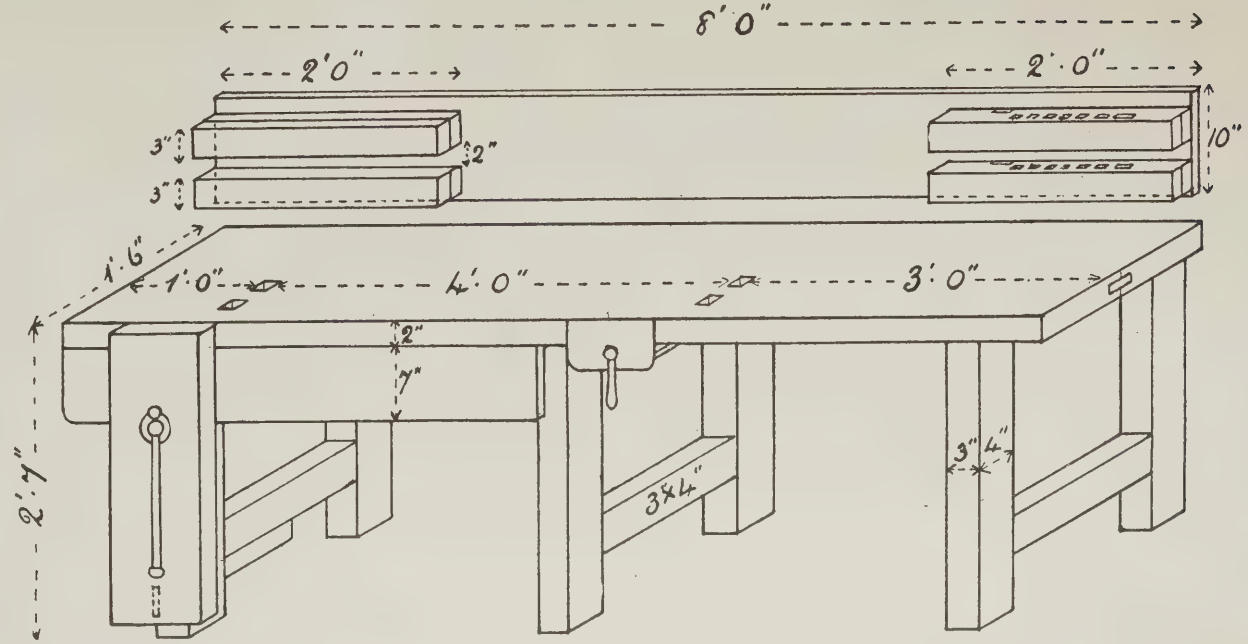
14.—(1) The Board of a rural or village school which is unable to comply with the provisions of the General Regulations above, but which maintains classes in Manual Training as applied to work on the farm, employing a teacher with a certificate obtained on a Departmental examination in this subject, and providing a course of study and accommodations and equipment approved by the Minister before the classes are established, will be paid by the Minister out of the Federal and Legislative Grants, an initial grant to a maximum of $75 and a subsequent annual grant to a maximum of $30, said grant to be expended on the accommodations, equipment, and supplies for Manual Training. In no year, however, will the Departmental grant exceed the total expenditure of the Board for these classes.

(2) On the report of the Inspector of Manual Training that the organization and the teaching of the classes in Manual Training maintained as provided above, are satisfactory, an annual grant, in addition to the regular salary paid by the Board will be paid by the Minister out of the Federal and Legislative Grants, as follows, to the teacher: $60 to the holder of an Intermediate certificate in Manual Training and $40 to the holder of a certificate in Elementary Manual Training.

(3) The foregoing provisions shall not apply to any School receiving grants for Manual Training under the General Regulations. The grants made to them cover the Manual Training of all the Forms.

FIG. 1.

BENCH, FIXED TO THE WALL OF CLASS ROOM, FOR TWO PUPILS.
This may be taken as representing two units, which may be increased indefinitely, according to the space available.



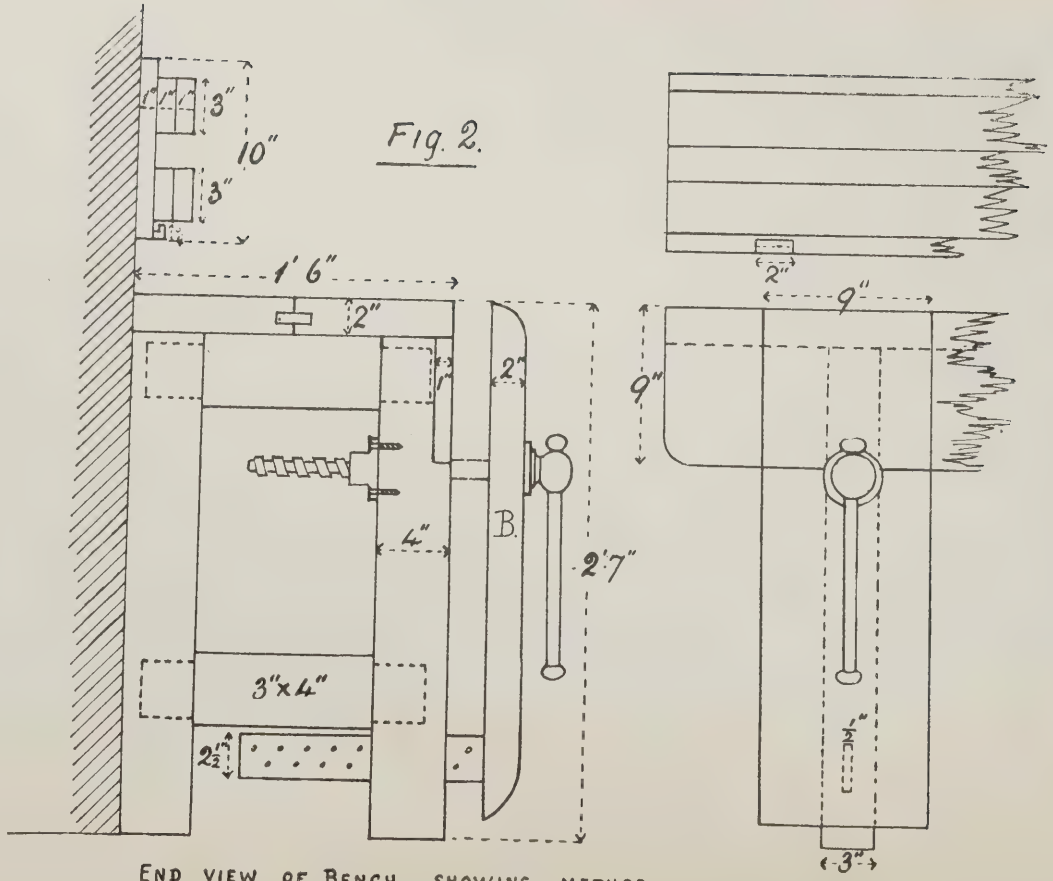
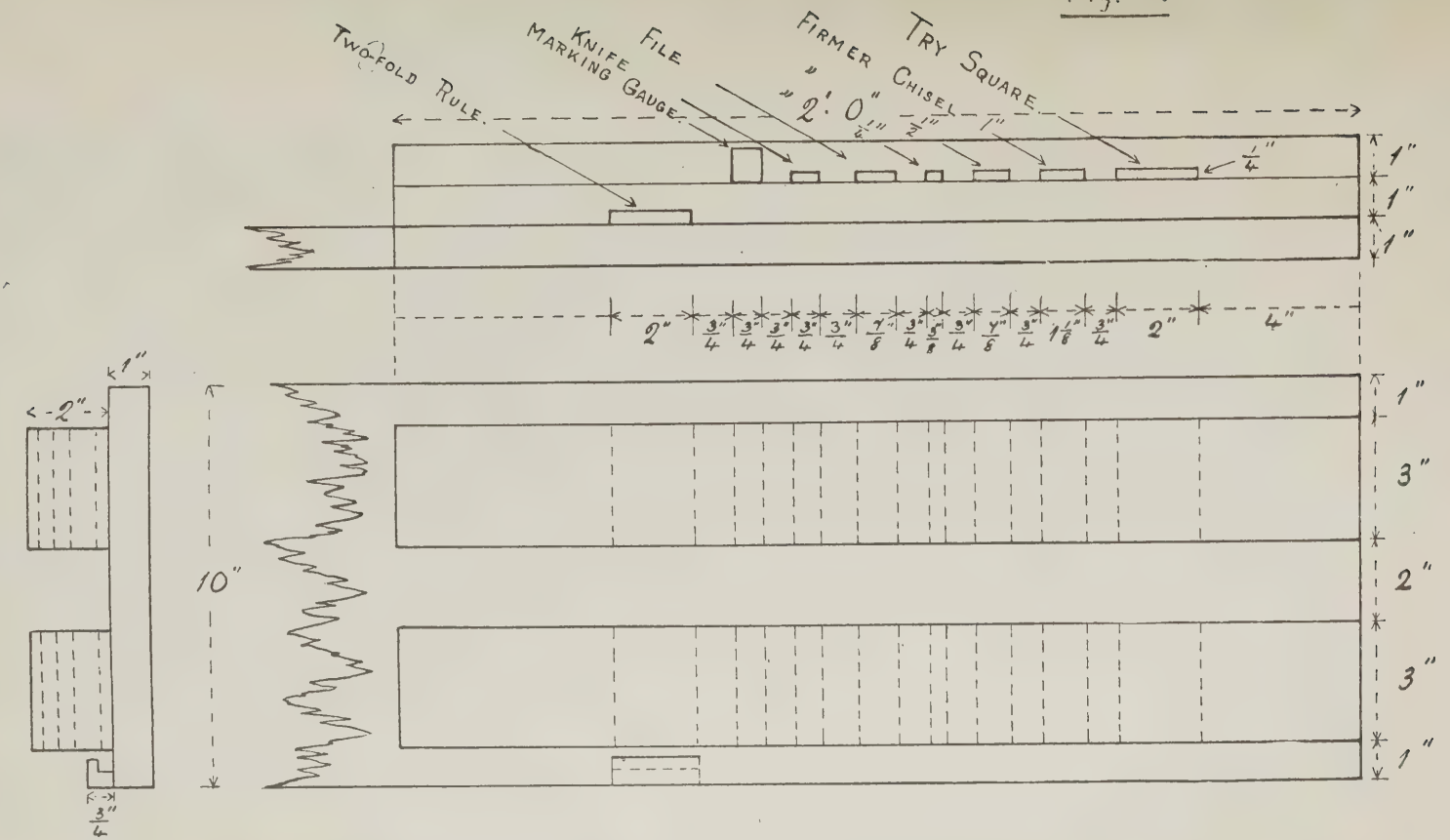


Fig. 2.

END VIEW OF BENCH SHOWING METHOD OF FIXING TAIL VICE. B.

Fig. 3.



Enlarged View giving details of Rack for one set of Bench Tools.

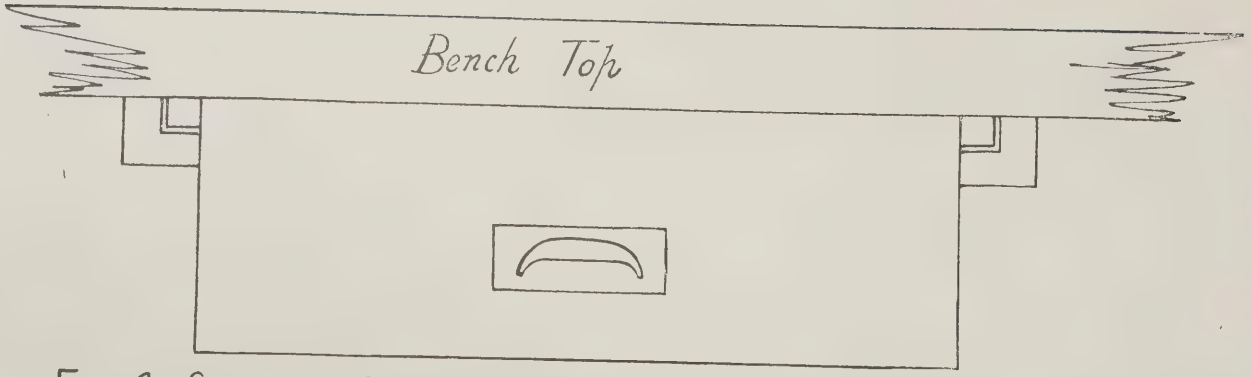


FIG. 4, SKETCH SHOWING SIMPLE METHOD OF FIXING DRAWER TO BENCH TOP

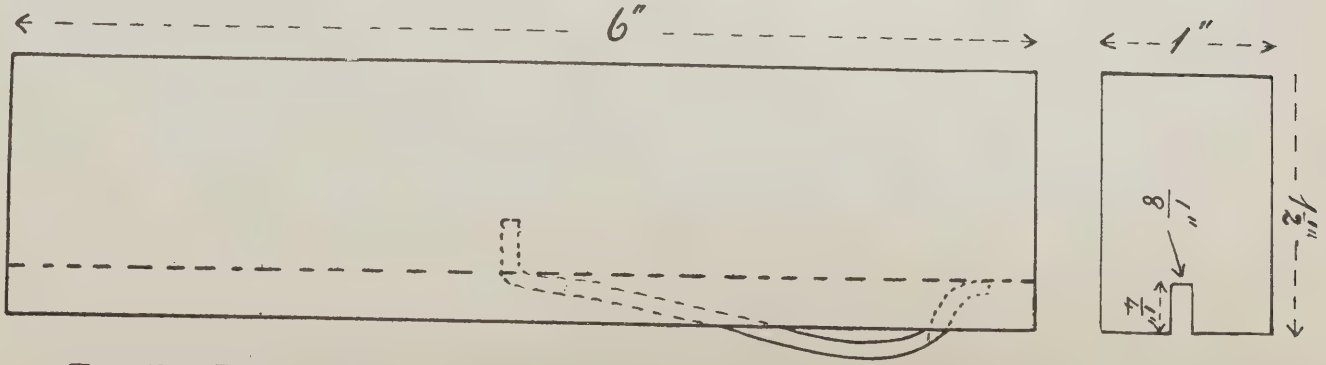
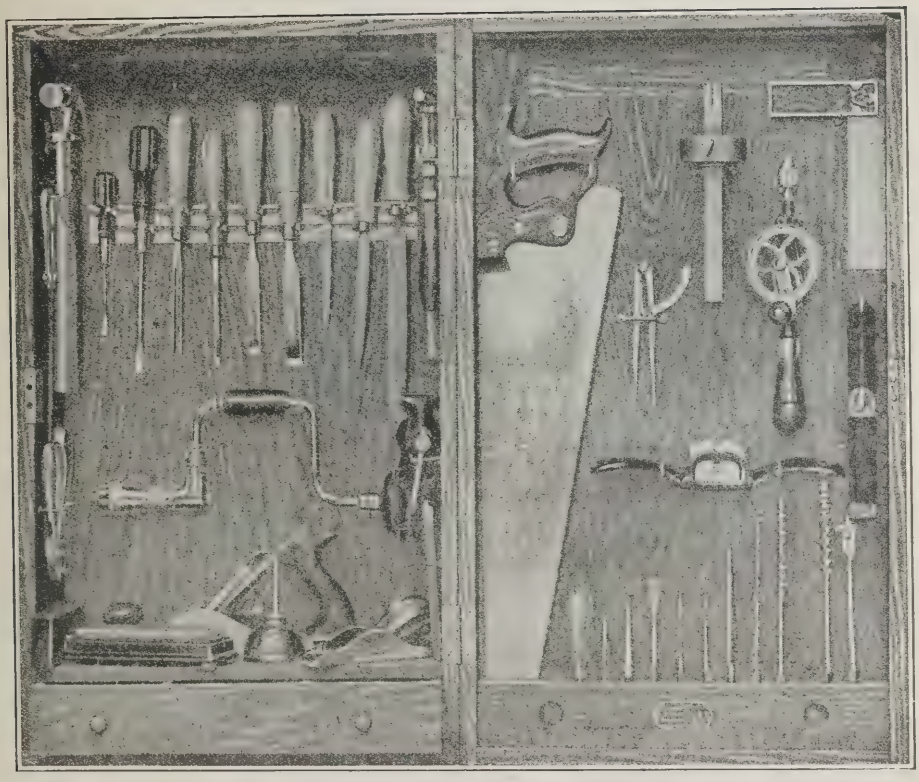
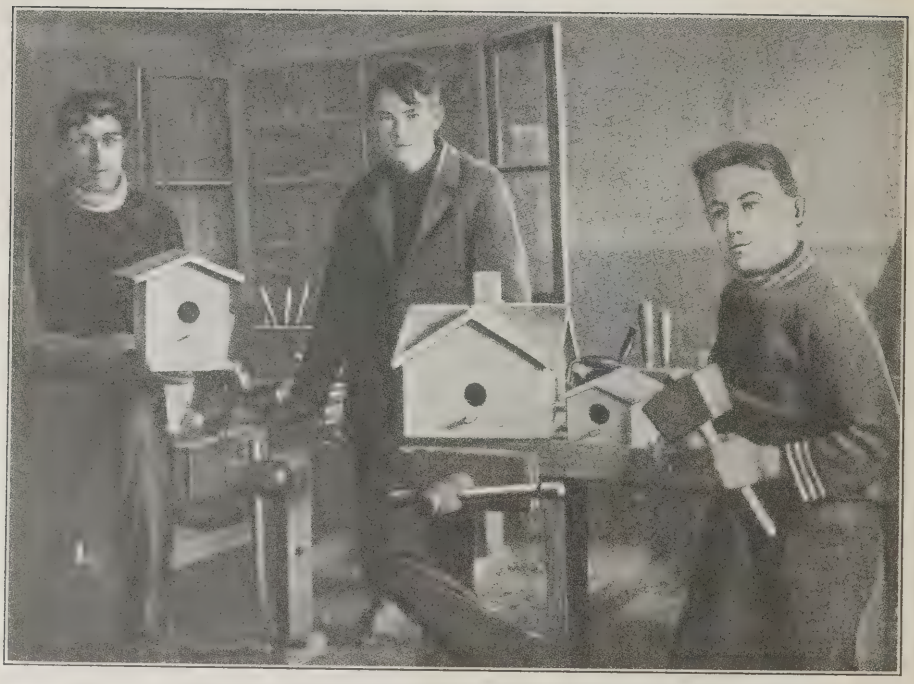


FIG. 5, PLAN AND ELEVATION OF BENCH STOP SHEWING METHOD OF FIXING SPRING.



Tool Cabinet for Rural School



Manual Training in a Rural School

Rural School Manual Training

II. HOUSEHOLD SCIENCE

Accommodations

15.—The following description of Household Science accommodations applies to the Schools provided for below.

Cookery, Sanitation, and Hygiene.—If a separate room is provided, the General Regulations as to accommodations apply. But such a room, though desirable, will be seldom available, and the elementary work may be done in the school room with the equipment given below. The trestle tables may be placed at one end and removed when not in use. If this is not practicable, the trestles may be placed across the desks in such a way that the pupils may work on each side. If the teacher's table has a flat top, this may be used in addition. The trestles may even be dispensed with and the table tops placed across the desks.

The Board shall also provide facilities for storing the utensils, supplies, and other requisites.

Equipment

16.—The following list of equipment is recommended for the schools provided for above:

The classes in these schools are generally small, so that an outfit suitable for individual work with a class of twelve will usually suffice, The following is a good basis and may be modified to suit conditions:—

12 bowls, brown	$0 85
12 bread tins	95
12 cups and saucers	1 25
12 tin measuring cups	1 25
12 egg beaters	30
12 forks	50
12 case knives	1 25
12 paring knives	1 25
12 plates	85
12 saucepans	1 68
12 tablespoons	50
24 teaspoons	40
12 wooden spoons	60
12 stew pans	2 40
12 strainers	65
2 trays	80
1 bowl, yellow	25
1 " "	35
1 " "	45
3 scissors	1 50
5 trestle tables	20 55
6 frying-pans	90
3 tea strainers	15
3 match-box stands	24
1 emery knife	20
3 soap dishes	25
12 pepper shakers	1 50
12 salt shakers	1 50
1 bell	50
4 lemon reamers	40
6 stoves, kerosene	6 00
12 plates, dinner	1 25
6 plates, soup	60
4 jugs	60
1 jug	45
1 butcher knife	$0 30
1 French knife	60
2 spatulas	80
6 teaspoons	10
3 tablespoons	13
4 brushes	20
2 stove mitts	50
4 asbestos mats	20
1 corkscrew	25
4 egg beaters	60
4 wash basins	92
4 draining pans	69
4 dish pans	2 00
6 broilers	48
3 cake tins	35
4 graters	40
3 strainers	75
24 patty-pans	20
2 tin dippers	40
2 fibre pails	70
1 colander	35
1 pail, enamel	70
1 pan, enamel	18
3 tea-kettles	2 70
1 saucepan	30
1 saucepan	25
1 saucepan	23
1 double boiler	85
1 kettle, covered	60
*1 stove to burn coal or wood	30 00

*** The above may be replaced by a twenty-dollar wood stove or a ten-dollar, two-burner coal-oil stove.**

Whenever the expense of the foregoing equipment is too great, a "packing-box" equipment suitable for six pupils may be substituted. The outlay for this will vary according to what is provided, but it can in no case be large. The following list will be suggestive:

FOR CLASS

3 bread boards	$0 15
1 rolling-pin	05
3 baking-powder can tops, for cookie cutters	
1 flour sifter	10
1 large frying-pan	25
1 double boiler	50
1 quart kettle	25
1 tea-kettle	50
1 broiler	20
1 garbage can	25
2 pitchers	25
2 apple corers	10
1 chopping knife	10
1 chopping bowl	05
6 muffin tins at 2c.	12
2 layer cake tins	10
3 dish pans	45
3 rinsing pans	30
1 strainer	05
6 china plates	30
3 mixing bowls	30
6 sauce dishes	15
6 cups and saucers	30
1 coffee-pot	25
1 tea-pot	10
3 bread pans	15
6 quart jars	30
3 wooden pails with covers	30
6 dish towels	$0 48
3 dish towels	15
3 hand towels	15
1 broom	30
1 dust-pan	08
1 scrubbing-brush	10
1 scrubbing pail	20
1 Dover egg beater	09
1 pepper shaker	05
1 salt shaker	05
1 baking dish	10
1 bread knife	25
1 packing-box table	1 00
1 corkscrew	10
1 packing-box cupboard	50
Large blue-flame oil stove	10 00

INDIVIDUAL EQUIPMENT FOR SIX PUPILS

1 white bowl, 1 qt.	$0 07
1 measuring cup	05
1 granite plate	10
1 saucepan	05
1 tin cover	05
1 steel fork	10
1 steel knife	10
1 tablespoon	03
2 teaspoons	05
1 oil stove	75
1 asbestos mat	05

Sewing Room.—Where the sewing prescribed in the course of study for the different Forms is taken in the ordinary class room, as will almost invariably be the case, the following equipment will be sufficient for each pupil:

A work box containing scissors, thimble, thread, cushion and pins, needles, measure and emery, and costing from 50c. to 75c. per set, is required. The boxes may be made of millboard, or candy boxes may be used. A special cupboard should be provided for these boxes and the working material. A demonstration frame of coarse canvas and mounted on a stand is also useful to teach the various stitch forms.

NOTE.—Much of the work in Elementary Household Science may be done out of school hours, but definite provision must be made for this subject in the time-table. The actual work that can be done in the school room will of necessity be limited in amount, but the teacher should make every effort to interest the parents and encourage home practice. In addition to the school practice, recipes and methods should be placed on the blackboard, thoroughly explained, and then tried at home, the pupils being encouraged to bring, when possible, the products to school for examination and comparison. In some schools parents report to the teacher each week the actual home work done by the girls. These reports relate to general housekeeping as well as to cookery. The school equipment should also be used for serving light refreshments at parents' meetings and social functions held at the school.

Legislative Grants

17.—(1) The Board of a village or a rural school which is unable to comply fully with the provisions of the General Regulations above but which maintains classes in Household Science, employing a teacher with a certificate obtained on a Departmental examination on this subject, and providing a course of study and accommodations and equipment approved by the Minister before the classes are established, will be paid by the Minister out of the Federal and Legislative Grants an initial grant to a maximum of $75 and a subsequent annual grant to a maximum of $30, said grants to be expended on the accommodations, equipment, and supplies for Household Science. In no year, however, will the Departmental grant exceed the total expenditure of the Board for these classes.

(2) On the report of the Inspector of Household Science that the organization and the teaching of the classes in Household Science maintained as prescribed above, are satisfactory, an annual grant, in addition to the regular salary paid by the School Board, will be paid by the Minister out of the Federal and Legislative Grants, as follows, to the teacher: $60 to the holder of an Ordinary certificate in Household Science, and $40 to the holder of a certificate in Elementary Household Science.

The foregoing provisions shall not apply to schools receiving grants for Household Science under the General Regulations. The grants made to them cover the Household Science of all the Forms.

CONTINGENCY OF GRANTS BY ONTARIO DEPARTMENT OF EDUCATION

18. If in any year the amount voted by the Legislature of Ontario for any of the courses recognized in Regulations 7, 11, 14, and 17 above is insufficient to pay the grants in full, the Minister may make a *pro rata* reduction in the case of such grants.

REGULATIONS FOR TEACHERS' CERTIFICATES

INTERIM CERTIFICATES

Elementary

1.—(1) Elementary certificates in Manual Training and Household Science will be granted by the Department of Education to the teachers with First or Second Class certificates who have taken, in the two prescribed parts, the Summer School course in Manual Training with the Winter reading course or the Household Science at the University of Toronto, and who have passed the prescribed examinations and other tests. These certificates qualify as teachers of wood-work only, in any Provincial school except a Collegiate Institute.

(2) Teachers who have obtained Elementary certificates under the Regulations of 1915 will be granted the present Elementary certificate on completing the second part and passing the final examinations thereon, including the examination on the winter reading course.

(3) Teachers who complete one summer course before 1915 will be granted Elementary certificates under the present Regulations, on successfully completing the work and passing the examination in the second part with, in addition, a paper on Constructive Work and a paper on the books prescribed for study during the first part.

Ordinary

2.—(1) The training of teachers of Manual Training for an Interim Ordinary certificate qualifying them to teach metal-working as well as wood-working is provided for in the Macdonald Institute, Guelph.

(2) Applications for admission shall be made to the President of the Ontario Agricultural College, Guelph, not later than September 1st.

(3) To be admitted, the applicants shall forward certificates similar to those required from candidates for admission to the course in Household Science as detailed in Regulation 3 below.

(4) (*a*) The course shall extend over one year.

(*b*) On passing the final examination and other tests on the course prescribed, the candidate will be granted an Interim Ordinary certificate in Manual Training.

3. Only the courses in Household Science at the University of Toronto will be recognized by the Department of Education for Interim Ordinary certificates in Household Science.

A candidate for admission to the course for the Ordinary certificate in Household Science should make application on a form to be obtained from the Secretary of the Faculty of Education and should submit with this application not later than September 1st:

(1) A certificate from a competent authority that she is a British subject.

(2) A certificate from a clergyman or other competent authority that she is of good moral character.

(3) A certificate from a physician that she is physically able for the work of a teacher and, especially, that she is free from serious pulmonary affection and from seriously defective eyesight or hearing.

(4) A statement signed by herself to the effect that she intends, when opportunity offers, to teach the subject of Household Science.

(5) One of the following:

(*a*) A Second Class or First Class Public School or a High School Assistant's certificate.

(*b*) A Kindergarten-Primary or a Kindergarten Director's certificate together with a Normal Entrance or Faculty Entrance certificate (in full).

Specialists

4.—(1) The holder of an Ordinary certificate in Manual Training who presents evidence of at least one calendar year's employment as a mechanic in a shop will be granted an Interim Specialist's certificate in Manual Training, the evidence and character of such employment to be satisfactory to the Minister.

(2) Graduates in Arts in the Department of Household Science of the University of Toronto in a course approved by the Minister will be entitled to an Interim Specialist's certificate in Household Science on completing the professional course and passing the examinations thereon at the Faculty of Education.

PERMANENT CERTIFICATES

5.—(1) An Interim Elementary, Ordinary, or Specialist's certificate in Manual Training will be made permanent on the report of the Inspector that the holder has completed satisfactorily at least two years' service as a Manual Training teacher in one or more of the schools of the Provincial system, and has been employed as a mechanic in a shop for at least two months, the evidence and character of such employment to be satisfactory to the Minister.

(2) An Interim Elementary, Ordinary, or Specialist's certificate in Household Science will be made permanent on the report of the Inspector that the holder has completed satisfactorily two years' service as teacher of Household Science in one or more of the schools of the Provincial system.

COURSES AND EXAMINATIONS FOR TEACHERS' CERTIFICATES

AT THE UNIVERSITY OF TORONTO

I. Certificate in Elementary Manual Training

1.—(1) The work prescribed for the certificate in Elementary Manual Training is covered in two consecutive Summer sessions at the University of Toronto, in two parts, which shall be taken in the order prescribed. Both parts will be taken up each year.

(2) Candidates who hold First or Second Class certificates who have taken the prescribed Summer and Winter courses and have passed the prescribed examinations and other tests on said courses, will be granted certificates as teachers of Elementary Manual Training.

(3) Teachers who obtained Elementary certificates before 1916 will be granted Elementary certificates under the present Regulations on completing the course in Part II and passing the final examinations thereon, including the examination on the Winter reading course.

(4) Teachers who complete one Summer course before 1915 will be granted Elementary certificates under the present Regulations on successfully completing the work and passing the examination on the course in Part II, with, in addition, the paper on Constructive Work and the paper on the books prescribed for study during the course in Part I.

(5) Teachers who pass on the sessional work of the course in Part I, but fail on the written examination may re-write the written examination on the course in Part I along with the written examination on the course in Part II.

(6) The Ordinary certificate in Manual Training will be granted to the holders of the Elementary certificate, on taking the course and passing the examination in Metal Work at Guelph.

COURSES OF STUDY

Part I

2. The following is the course of study:

Pedagogics of Manual Training

Relation to general education.
Relation to industrial and technical education.
Lesson plans and methods of teaching in both graded and ungraded schools.
Planning and equipping buildings and rooms.

Drawing

The importance of drawing in connection with all industry.
The use of ruler and square in measuring an object and working out a simple plan.
Proper care and use of instruments.
Construction and use of scales.
Drawing to a scale.

Dimensioning.

Plain lettering.

Practice in freehand sketching as preparation for working drawings.

Use of drawing board, tee and set squares. Use of instruments in working out problems in plane and solid geometry—square, triangles, polygons, ellipses and type solids.

Working drawings.

Orthographic projection.

Plans and elevations; their relation to one another.

Inking drawings.

Design—Structural and Decorative

A study of the principles of structural and decorative design based on the critical observation of typical examples.

Discussion of suitability of any design as applied to projects in different materials.

Application of design to constructed objects in paper, cardboard, wood or metal.

Practical Work

Primary Constructive Work: A brief review of the course covered in the Normal Schools, with emphasis on the work of the higher grades, as follows:

Work in paper and cardboard. Making book-covers and portfolios: simple bookbinding. Modelling in clay or plasticine. Knife work in thin wood—and easy rustic work—such as can be carried on at the ordinary school desks.

The working out of projects involving the use of the various forms of joints, such as—mortise and tenon, dovetail, lap or mitre.

Fastenings: Dowels, cleats, wedges, glue, screws and nails.

Exercises in wood-turning.

Special attention to sharpening edge-tools and keeping them in proper condition.

General shop practice with tools.

Application of finishes to articles made.

Use of stains, fillers, fuming, shellac, oil and wax.

Lumber and Timber

Woods: Characteristics of each, colour, grain, for what suited.

Trees: Common varieties, identification by means of their form, leaf, bark, and wood.

TEXT BOOKS

3.—(1) The following are the text-books prescribed for study during the course:

The Service of the Hand in the School. Bone	$1.00
Longmans, Green & Co., London.	
Fine and Industrial Arts in Elementary Schools. Sargent	1.00
Ginn & Co., Boston.	
Theory of Educational Sloyd. Saloman	1.25
Silver, Burdette & Co., Boston.	

BOOKS OF REFERENCE

(2) The following additional books are recommended for reference:

Educational Handwork. Kidner $1.00
Educational Book Co., Toronto.

Clay Work. Lester 1.25
Manual Arts Press, Peoria, Ill.

*Paper and Cardboard Construction. Buxton & Curran 1.50
Manual Arts Press, Peoria, Ill.

*Essentials of Woodworking. Griffith 2.00
Manual Arts Press, Peoria, Ill.

*Handwork in Wood. Noyes 2.00
Manual Arts Press, Peoria, Ill.

*Correlated Courses in Woodworking and Mechanical Drawing. Griffith .. 1.50
Manual Arts Press, Peoria, Ill.

Applied Mechanical Drawing. Matthewson & Stewart 1.00
Taylor Holden Co., Springfield.

Principles of Design. Batchelder 3.00
Inland Printer Co., Chicago.

*Wood and Forest. Noyes 3.00
Manual Arts Press, Peoria, Ill.

Winter Course

Reading

4.—(1) The following Reading Course is prescribed for winter work between Part I and Part II:

Educational Meaning of Manual Arts and Industries. Row $1.25
Row, Peterson & Co.

Manual Arts for Vocational Ends. Crawshaw ..... .85
Manual Arts Press, Peoria, Ill.

Industrial Education. Leake 1.50
Houghton, Mifflin Co., Boston.

School and Society. Dewey ..... .75
Doubleday, Page & Co., New York.

Woodwork

(2) In addition to the Winter Reading Course prescribed above, candidates will be required to complete between Part I and Part II one or more projects, which will be prescribed for each student at the close of Part I. The work done, together with drawings, specifications, estimates of material and cost, and other necessary particulars, must be submitted to the Instructor before entering on the Second Part, at a date to be fixed by him.

Part II

5. The following is the course of study:

Pedagogics of Manual Training

Present developments in Manual Training and their relation to former systems; such as, apprenticeship, Russian, and Swedish systems, and to industrial and technical education.

Organization of classes and equipment of schools continued.

Drawing

Plane geometry continued. More advanced working drawings and orthographic projections. Plans and elevations involving oblique planes and sections. Isometric projection—relation to orthographic and to perspective drawing.

Making tracings and blue prints.

Freehand sketching continued.

Design

Suitability of different designs to the work undertaken in wood or metal. The need of adapting design to material and use of article.

The working out and applying of designs by the student.

Practical Work

Construction.

Book-binding and the care and repair of books.

Easy exercises in leather.

Woodwork.

Bench work continued.

The speed-lathe and wood-turning.

Suitability of different woods for the work undertaken.

Estimating quantity and cost of material.

Sheet Metal Work.

Simple exercises in sheet metal.

Tools.

Mechanical principles involved in their structure and proper use.

Finishing.

Suitability of different finishes to the work done.

Lumber and Timber

Forests—their value and preservation.

Lumber and lumbering—cutting, transporting, seasoning, shrinking, and warping.

Defects in lumber—knots, sapwood, shakes, etc.

Sources of commercial woods.

BOOKS OF REFERENCE

6. The following books, together with the last six books of reference given under Part I, are recommended for reference:

Art Crafts for Beginners. Sanford ..... Century Co., New York.	$1.20
Handcraft in Wood and Metal. Hooper and Shirley ..... Manual Arts Press, Peoria, Ill.	3.00
Art Metal Work with Inexpensive Equipment. Payne ..... Manual Arts Press, Peoria, Ill.	1.50
Design and Construction in Wood. Noyes ..... Manual Arts Press, Peoria, Ill.	1.50
Leather Work. Mickel ..... Manual Arts Press, Peoria, Ill.	.75

EXCURSIONS

7. During both parts of the course, visits will be made to nearby parks or woods to study, as a basis for discussion, the characteristics of the timber trees and to museums to study the historical development of structural and decorative design.

EXAMINATIONS

Valuation and Standard

8.—(1) (*a*) The standing of the students in Part I will be determined by the Sessional Records and the final written examinations taken together. For this purpose, the sessional work will be valued at 600 marks, and the written examination will include a paper on Constructive Work and the methodology thereof, one on Drawing and Design, one on Timber and Tools, and one on the books prescribed for study; each paper being valued at 100 marks.

(*b*) The Sessional Records shall consist of the oral and written tests and the practical work throughout the session.

(2) The standing of students in Part II will be determined on the same basis as the standing in Part I, except that the practical work completed between Part I and Part II will be regarded as one additional subject (max. 100) and a paper on Theory and Method (max. 100) is substituted for the paper on Constructive Work, as defined below, and one on the Winter Reading Course (max. 100) for the paper on books prescribed for study, and a practical examination (maximum 100) is added.

(3) The percentage requirements to pass in either part are 40 per cent. of the marks in each subject or paper, and 60 per cent. of the aggregate of the marks for the sessional work and the final examination taken separately.

(4) Except the written examination on the Winter Reading Course, which will be held at some convenient time during the second session, the written examinations will be held at the close of the course.

9. The following are the subjects of the final written examination:

Part I

(1) Elementary Constructive Work and the Methodology thereof.
(2) Drawing and Design:
    Geometrical Drawing.
    Orthographic Projection. Plans and Elevations.
    Designing.
(3) Timber and Tools:
    The common timber trees of Ontario, their characteristics and uses.
    Lumber—its preparation, care and defects.
    Tools—their use and care.
(4) Text book prescribed for study.

Part II

(1) Winter Reading Course.
(2) Theory and Method:
    Relation of Manual Training to general education, and to industrial and technical education.
  Methods of Teaching Manual Training.
(3) Drawing and Design:
    Paper similar to that on Part I, but covering more advanced work.
(4) Timber and Tools:
    Paper based on the work of the session and the books to be read.
(5) Practical Examination in Woodwork.

II—Certificate in Elementary Household Science

10.—(1) The work prescribed for the certificate in Elementary Household Science is covered in two consecutive Summer sessions at the University of Toronto, in two parts, which shall be taken up in the prescribed order. The course in Part II will be given in 1916 and in Part I in 1917.

(2) Candidates who hold First or Second Class certificates, who have taken the prescribed Summer courses and have passed the prescribed examinations and other tests on said courses will be granted certificates as teachers of Elementary Household Science.

NOTE.—The courses and examinations for Specialists' certificates in Household Science will be taken as heretofore at the University of Toronto; those for Ordinary certificates will also be taken hereafter at the University of Toronto, not as heretofore at the Ontario College of Agriculture, Guelph. For admission to the latter, application should be made to the Secretary, Faculty of Education, Toronto.

11.—(1) Students are required to provide themselves with plain white aprons for work in the food laboratories. Dark ones may be worn in the household management classes.

(2) A deposit of $1.00, payable to the chief instructor, is required of each student. This amount, minus the cost of equipment destroyed, will be returned at the end of the course.

COURSES OF STUDY

12. The following are the courses of study:

Part I

Sewing

The course prescribed for the Normal Schools will be continued with the application of the stitches to useful articles. Any necessary modifications of the course to suit the student's stage of advancement will be made by the instructor.

Household Management

Cleansing agents and methods of using them, with practical applications in the care of the school room and its furnishings, utensils, etc.

The house: planning, furnishing, heating, lighting, ventilating, disposing of waste, etc.

Emergencies: immediate treatment of everyday injuries, simple bandaging, etc.

Part II

Foods and their Preparation

Lectures on foods and a study of the methods of preparing food materials.

In the laboratory, staple foods such as, cereals, vegetables, fruits, eggs, milk, cheese, meats are prepared, and practice is given in the planning and preparation of children's meals.

Special attention is given to food work applicable to Rural Schools.

BOOKS OF REFERENCE

13. The following is a list of books recommended for reference; those of special importance are indicated by an asterisk:—

Food and Dietetics. Hutchison ..... Wm. Wood & Co., New York.	$3.00
Food Products. Sherman ..... The Macmillan Co., Toronto.	2.25
*Source, Chemistry and Use of Food Products. E. H. S. Bailey ..... Blakiston, Philadelphia.	1.60
*Lessons in Elementary Cooking. M. C. Jones ..... Whitcomb and Barrows, Boston.	1.00
First Lessons on Food and Diet. Richards ..... Whitcomb and Barrows, Boston.	.30
The New Housekeeping. Frederick ..... Doubleday, Page & Company, New York.	1.00
The Housekeeper's Handbook of Cleaning. MacLeod ..... Harper and Bros., New York.	1.00
Bacteria Yeasts, and Moulds in The Home. Conn ..... Blakiston, Philadelphia.	1.00
*Household Foes. Ravenhill ..... Sedgwick and Jackson, London.	.75
*Homecraft in the Classroom. Mary Hill ..... Pitman & Son, London.	.60
*Manual of Sewing ..... Ontario Department of Education.	.20
*Shelter and Clothing. Kinne & Cooley ..... The Macmillan Co., Toronto.	1.10
*First Aid to the Injured. James Cantlie, M.B., F.R.C.S..... St. John Ambulance Association, Toronto.	.40
*Hints and Helps for Home Nursing and Hygiene. E. MacDowell Cosgrave, M.D. ..... St. John Ambulance Association, Toronto.	.40

EXAMINATIONS

14.—(1) The standing of the candidate will be determined by the marks for the sessional record and the final written examination combined.

(2) The sessional record shall consist of the oral and written tests and practical work throughout the session.

(3) The subjects of the examination shall be as follows:

Foods and Food Preparation; maximum marks, 200.
Household Management and Sewing; maximum for each, 100.

(4) For each subject, the maximum marks for the sessional record and final written examination shall be equal.

(5) The percentage requirements to pass shall be forty per cent. of the sessional work in each subject and forty per cent. of the total marks for each subject, and sixty per cent. of the aggregate for the three subjects.

III. Ordinary Certificate in Household Science

SESSION

15.—(1) The Courses of Study for an Ordinary certificate in Household Science are covered in one college session at the Faculty of Education, University of Toronto.

(2) Regular and punctual attendance is compulsory.

(3) Students who in the opinion of the staff are unduly deficient in scholarship or whose conduct or progress or general health is unsatisfactory may be dismissed from attendance at any time during the session.

FEES

16.—(1) The annual fee, which shall include tuition, laboratory supplies, physical culture, and the use of the library of the Household Science Department, shall be $25.00.

(2) At the beginning of the session, a deposit of $2.00 will be required in each of the departments of Household Science and Elementary Applied Chemistry. These sums, less the cost of equipment and apparatus that may have been destroyed, will be returned at the close of the session.

(3) If a student who has been granted an Ordinary Certificate teaches the subject of Household Science in a school in the Provincial system during the year following the examination, the fee of $25 will be returned to her on the report to the Minister of Education by the Inspector of Household Science that the work has been satisfactorily performed. Applications for such refunds should be made to the Deputy Minister of Education on any date during the month of June.

COURSES OF STUDY

17. The following are the courses of study:

Food and Food Preparation

The manufacture, comparative cost, and nutritive value of food materials.

The scientific principles underlying methods of preparation, and the application of these principles in preparing common food materials. The laboratory work under this heading will include considerable practice, with the purpose of developing skill in handling materials and utensils.

Dietary standards, balanced rations, the construction of dietaries, the serving of meals.

Household Management and Housecraft

The care of the house; a study of the cleaning of metals, woods, and textiles (including laundry-work).

Sanitation; the effect of environment on health; the sanitary control of surroundings; the disposal of waste.

The hygienic and artistic furnishing of a house: the cost of furnishing.

Emergencies; bandaging; home care of the sick.

Sewing

Hand sewing; simple and advanced stitch forms with their applications.
Machine sewing and the care of the machine.
Use of patterns.

Elementary Applied Chemistry

The chemical nature of foods. There will be a short course of lectures on certain principles of organic chemistry and of biochemistry, necessary for the understanding of the composition of foods and of their physiological value, and elementary lectures and laboratory work on the more important aspects of the composition of foods and the changes which they undergo in digestion, putrefaction, etc. Students in this course will be expected to have a knowledge of elementary inorganic chemistry.

Methods in Household Science

The aims in teaching Household Science; the scope of Household Science; its relation to other subjects; methods of presenting Household Science to children, etc.; the planning of Household Science courses; discussions relating to equipment; cost of lessons, etc.

Observation and Practice Teaching

18. Observation and Practice Teaching will be provided in the Public and High Schools of Toronto and will include a minimum of six practice lessons per student with an equal number of periods for observation lessons.

BOOKS OF REFERENCE

19. Below is a list of suitable books of reference. Those marked with an asterisk are especially valuable.

*Source, Chemistry, and Use of Food Products. E. H. S. Bailey. Blakiston, Philadelphia.	$1.60
Household Bacteriology. Buchanan. The Macmillan Co., Toronto.	2.25
*Bacteria, Yeasts, and Moulds in the Home. Conn. Blakiston, Philadelphia.	1.00
Bacteria in Milk and Its Products. Conn. Blakiston, Philadelphia.	1.00
*Food and Dietetics. Hutchison. Wm. Wood & Co., New York.	3.50
Principles of Human Nutrition. Jordan. The Macmillan Co., Toronto.	1.75
Pure Foods. Olsen. Ginn & Co., Boston.	.75
*Food Products. Sherman. The Macmillan Co., Toronto.	2.25
Chemistry of Food and Nutrition. Sherman. The Macmillan Co., Toronto.	1.50
Human Foods. Snyder. The Macmillan Co., Toronto.	1.25

Practical Dietetics. Thompson 5.00
D. Appleton & Co., New York.

Foods and Their Adulteration 4.00
Wiley, New York.

Foods and Household Management. Kinne & Cooley 1.10
The Macmillan Co., Toronto.

Food Industries. Vulte & Vanderbilt 1.75
Chemical Publishing Co., Easton, Pa.

Household Chemistry. Vulte 1.50
Chemical Publishing Co., Easton, Pa.

Chemistry and Its Relation to Daily Life. Kahlenberg & Hart 1.25
The Macmillan Co., Toronto.

Household Physics. Butler 1.30
Whitcomb & Barrows, Boston.

*Household Hygiene. Maria Elliott ..... .75
American School of Home Economics, Chicago.

*The Housekeeper's Handbook of Cleaning. MacLeod 1.00
Whitcomb & Barrows, Boston.

*Laundering. Balderston 1.25
L. R. Balderston, 1224 Cherry St., Philadelphia.

Guide to Laundry Work. Chambers ..... .75
Whitcomb & Barrows, Boston.

Textiles. Dooley 1.25
D. C. Heath & Co., Boston.

*Textiles and Clothing. K. H. Watson ..... .75
American School of Home Economics, Chicago.

Household Textiles. Gibbs 1.25
Whitcomb & Barrows, Boston.

*Textiles. Woolman & McGowan 2.00
The Macmillan Co., Toronto.

*Shelter and Clothing. Kinne and Cooley 1.10
The Macmillan Co., Toronto.

Domestic Art in Woman's Education. Cooley 1.25
C. Scribner's Sons, New York.

*Textbook of Clothing and Textiles for the High Schools. (In press.)
Laura I. Baldt .....
J. P. Lippincott Co., Philadelphia.

School Needlework. Teachers' Edition ..... .75
Ginn & Co., Boston.

The Dressmaker ..... .50
Butterick Publishing Co., Toronto.

How Shall the Little Ones Sew? Johnson 10
The People's University Extension Library.

*A Sewing Course. Woolman 1.50
F. A. Fenald, Washington.

Journal of Home Economics ..... a year 2.00
American Home Economics Association, Roland Park, Baltimore, Md.

EXAMINATIONS

20.—(1) Candidates for the Ordinary certificate shall pass in each of Parts I and II under the following conditions:

Part I

(*a*) The following shall be the subjects in Part I with the maximum value for each subject:

Foods and Food Preparation	400	Sewing	200
Household Management	200	Elementary Applied Chemistry	200

The standing of candidates in the subjects of Part I will be determined by the sessional records and the final written examinations.

The sessional records, to which shall be allotted one-half the maximum value assigned above to each subject, shall consist of the oral, written, and practical tests given therein throughout the session.

The final written examinations, to which shall be allotted the remaining half of the maximum value assigned above to each subject, shall include the following papers:

Foods and Food Preparation and Household Management, 2 papers each.

Sewing and Elementary Applied Chemistry, 1 paper each.

On each paper in these subjects (except Elementary Applied Chemistry) there will be one or more questions on Methods in Household Science.

The pass standard in Part 1 shall be 40% of the marks assigned to the sessional records in each subject and 40% of the aggregate marks for each subject and 60% of the aggregate of the marks for the Part.

Part II

(*b*) The standing of candidates in Part II shall be determined wholly by the sessional records. For this purpose the maximum value assigned to practice lessons shall be 300, and to observation lessons, 100.

The pass standard in Part II shall be 60% of the aggregate of the marks for the practice lessons and the observation lessons.

(2) Candidates who fail in Part II or fail to obtain 40% of the marks assigned to the sessional records in each subject of Part I must repeat the session if they wish to qualify for the Ordinary certificate. Candidates who fail in Part I but who obtain the required minimum of 40% in the sessional work of each subject thereof may qualify for the Ordinary certificate in any subsequent year without attending again by repeating the final written examinations, and complying with the pass standards defined above, the marks of their sessional records being again taken into account in determining the result.

21. A candidate who takes the course and passes the examinations thereon prescribed above shall be entitled to an Interim Ordinary Household Science certificate which shall be valid in these subjects in any Public, Separate or High School of the Province and will be made Permanent on the report of the Inspector or Inspectors concerned that the holder thereof has taught successfully the subjects thereof for at least two years.

AT THE ONTARIO AGRICULTURAL COLLEGE, GUELPH

Ordinary Certificate in Manual Training

22.—(1) The work prescribed for the Ordinary certificate in Manual Training is covered in one session at the Ontario Agricultural College.

(2) Teachers holding First or Second Class certificates are eligible for admission, and are required to provide themselves with the necessary text-books and a good set of drawing instruments.

(3) Students in this course are not eligible for board and lodging at the College residence.

COURSES OF STUDY

23. The subjects of study and practice are as follows:

Theory

School Management: Organization and Control; Planning and Equipping of Buildings; Lighting; Ventilation, etc.

A thesis on some subject in the course of study or connected therewith. All theses must be written on foolscap paper and must contain at least twelve pages of matter. They must be submitted for examination to the Professor in charge not later than April 15th.

Practice Teaching

Practice teaching is provided at the Macdonald Consolidated School and the Guelph City Public Schools. Each student is required to teach not less than six lessons: two on the construction of tools, two on mechanical drawing, and two in practical work.

Construction and Constructive Design

Modifications of given models, relation of lines and spaces, general proportion, refinement of parts.

Mechanical Drawing

A series of 35 plates:

The use of squares, triangles and instruments.
Plane geometry, practical problems, lines, angles, and polygons.
Construction and use of plain scales.
Orthographic projections of solids, three or more views.
Cutting and oblique planes and sections.
Isometric projection.
Working drawings of models made.
Tracing—blue printing.

Elementary Woodwork

A progressive series of simple models involving measuring, whittling, sawing, boring, and nailing. A series of six original models.

Ministry of Education, Ontario
Historical Collection

Advanced Woodwork

A series of 20 models.

Technical course of 15 models, requiring a higher knowledge of construction, and demanding greater skill in manipulation of tools and materials. Original work of at least one advanced model.

Bench work: Exercise in making articles requiring joints, mortises, fastenings with dowels, pins, cleats, keys, wedges, glue, screws and nails.

Estimates of cost: Calculations of the quantity of lumber required for the articles and the cost.

Tools: Their construction, use, care and sharpening; analysis of the action of cutting tools, cutting angles, etc.

Finishing: Staining, fuming, filling, shellacing, oiling, etc., as required in finishing the articles made.

Forestry and Lumber: Observation and consideration of the properties of the lumber used, their defects, their preparation in the mill, care, etc., structure, growth, seasoning, defects, etc., of timber.

Forging

A series of 20 models.

Exercises in drawing out, shaping, bending, twisting, slotting, upsetting, welding and in making shoulders and collars, embodied in the construction of articles such as staples, links, bolts, nuts, rings, eyes, chains, chisels, wrenches.

Machine Shop Practice

A series of 20 models.

Includes chipping, filing, fitting and finishing of work in cast iron, wrought iron and steel. Theory and practice of grinding cutting edge tools used in general machine shop practice; operation and use of lathes and drills. Screw-cutting by hand and machine, tempering and annealing.

Sheet Metal Work

A series of 10 models.

A short course of models such as a cake cutter, tweezers, round box, rectangular tray, pint measure, cup and funnel, involving various methods of jointing—butt, lapped, rivetted and bent joints; folding seams—cylindrical and taper; and exercises in wiring, swaging and grooving; the use of blow pipe, soldering irons, fluxes, soft and hard solders, etc.

Art Metal Work

A series of 20 models.

A course of models involving shaping, raising, matting, chasing, etching, soldering, brazing, rivetting and colouring. Making, grinding and sharpening the smaller tools used. Original work.

BOOKS OF REFERENCE

24. The following books are prescribed for reference:

*School and Society. Dewey	$1.00
University of Chicago.	
The Place of Industries in Elementary Education. K. E. Dopp	1.00
University of Chicago.	
*Theory of Educational Sloyd. Solomon	1.25
Phillips & Co., London.	
Industrial Education. A. H. Leake	1.25
Houghton, Mifflin Co., Boston.	
Design, Bases of Design, Line and Form. Walter Crane .....each	6s.
Bell & Sons, London, England.	
Classroom Practice in Design. James Parton Haney	.50
*Plain and Solid Geometry. I. H. Morris	.65
Longmans, Green & Co., New York.	
*Notes for Forge Shop Practice. J. D. Littlefield	1.05
Taylor, Holden Co.	
Applied Mechanical Drawing. Mathewson & Stewart	1.00
Taylor, Holden Co.	
*Handwork in Wood. Wm. Noyes	2.00
*Design and Construction in Wood. Wm. Noyes	1.50
Metal Work and Etching. J. A. Adams	.50
Forge Practice. Bacon	
Economics of Manual Training. Rouillion	
*Wood and Forest. Noyes	
Machine Shop Practice. W. J. Kaup	1.25
*Copper Work. A. F. Rose	.50
The Davis Press, Worcester, Mass.	

EXAMINATIONS

Written

25.—(1) The written examinations will be distributed throughout the three terms and the subjects will be as follows:

Theory of Sloyd.
Construction and use of woodworking tools.
Principal Commercial woods of Canada.
School and Society.
Forging.
Sheet Metal Work.
The Place of Industries in elementary education.
Drawing.
Constructive design.
Organization.

The maximum mark assigned to each subject is 100. To pass, forty per cent. is required of the marks in each subject and sixty per cent. of the aggregate of the marks.

Practical

(2) The practical work will be done throughout the year as prescribed in the Course of Study. Each model or exercise will be allotted 10 marks and 6 must be obtained before the exercise can be accepted. All the work outlined must be completed to entitle the candidate to the certificate.

INSTRUCTIONS AND REGULATIONS

26. Instructions may be issued by the Minister from time to time to Inspectors or other officers in carrying out the provisions of the Regulations of the Department of Education.

REPEAL OF REGULATIONS

27. All former Regulations of the Department of Education that are inconsistent with the Regulations in this circular are hereby repealed.